



INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)



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(54) Title: METHOD FOR THE DETECTION OF GENE TRANSCRIPTS IN BLOOD AND USES THEREOF (54) Titre: TECHNIQUE DE DETECTION DE TRANSCRITS GENIQUES DANS LE SANG ET LEUR UTILISATION		
(57) Abstract <p>The present invention is directed to detection and measurement of gene transcripts in blood. Specifically provided is a RT-PCR analysis performed on a drop of blood for detecting, diagnosing and monitoring diseases using tissue-specific primers. The present invention also describes methods by which delineation of the sequence and/or quantitation of the expression levels of disease-associated genes allows for an immediate and accurate diagnostic/prognostic test for disease or to assess the effect of a particular treatment regimen.</p> (57) Abrégé <p>Cette invention a trait à la détection et à la mesure de transcrits géniques dans du sang. Elle concerne plus précisément une analyse PCR-ADNC effectuée sur une goutte de sang aux fins de la détection, du diagnostic et de la surveillance de maladies à l'aide d'amorces à spécificité tissulaire. Elle porte également sur des techniques par le moyen desquelles la délimitation de la séquence et/ou la quantification des taux d'expression de gènes associés à des maladies permet(tent) d'effectuer un essai de diagnostic/pronostic immédiat et précis relatif à une maladie ou permet(tent) d'évaluer l'effet d'un schéma particulier de traitement.</p>		

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<p>(21) International Application Number: PCT/CA00/00005</p> <p>(22) International Filing Date: 5 January 2000 (05.01.00)</p> <p>(30) Priority Data: 60/115,125 6 January 1999 (06.01.99) US 09/477,148 4 January 2000 (04.01.00) US</p> <p>(71)(72) Applicant and Inventor: LIEW, Choong-Chin [CA/CA]; 81 Millersgrove Drive, Willowdale, Ontario M2R 3S1 (CA).</p> <p>(74) Agent: DEETH WILLIAMS WALL; National Bank Building, Suite 400, 150 York Street, Toronto, Ontario M5H 3S5 (CA).</p>		<p>(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p>Published Without international search report and to be republished upon receipt of that report.</p>
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<p>The present invention is directed to detection and measurement of gene transcripts in blood. Specifically provided is a RT-PCR analysis performed on a drop of blood for detecting, diagnosing and monitoring diseases using tissue-specific primers. The present invention also describes methods by which delineation of the sequence and/or quantitation of the expression levels of disease-associated genes allows for an immediate and accurate diagnostic/prognostic test for disease or to assess the effect of a particular treatment regimen.</p>		
<div data-bbox="812 1150 1096 1402"><p>APP APC M RT PCR RT PCR</p><p>600bp</p></div> <div data-bbox="795 1501 1226 1732"><p>BLOOD BVH HAH RT PCR RT RT M</p><p>600bp</p></div>		

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Description

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**METHOD FOR THE DETECTION OF GENE TRANSCRIPTS
IN BLOOD AND USES THEREOF**

BACKGROUND OF THE INVENTION

Cross-Reference to Related Application

This application claims the benefit of priority of provisional patent application U.S. Serial Number 60/115,125, filed January 6, 1999 and of a U.S. application entitled "Method for the Detection of Gene Transcripts in Blood and uses Thereof" filed on January 4, 2000 (application number not yet assigned).

Field of the Invention

The present invention relates generally to the molecular biology of human diseases. More specifically, the present invention relates to a process using the genetic information contained in human peripheral whole blood for the diagnosis, prognosis and monitoring of genetic and infectious disease in the human body.

Description of the Related Art

The blood is a vital part of the human circulatory system for the human body. Numerous cell types make up the blood tissue including monocytes, leukocytes, lymphocytes and erythrocytes. Although many blood cell types have been described, there are likely many as yet undiscovered cell types in the human blood. Some of these undiscovered cells may exist transiently, such as those derived from tissues and organs that are constantly interacting with the circulating blood in health and disease. Thus, the blood can provide an immediate picture of what is happening in the human body at any given time.

5 The turnover of cells in the hematopoietic system is enormous. It was
reported that over one trillion cells, including 200 billion erythrocytes and 70 billion
neutrophilic leukocytes, turn over each day in the human body (Ogawa 1993). As a
10 consequence of continuous interactions between the blood and the body, genetic
5 changes that occur within the cells or tissues of the body will trigger specific changes
in gene expression within blood. It is the goal of the present invention that these
genetic alterations be harnessed for diagnostic and prognostic purposes, which may
15 lead to the development of therapeutics for ameliorating disease.

 The complete profile of gene expression in the circulating blood
10 remains totally unexplored. It is hypothesized that gene expression in the blood is
20 reflective of body state and, as such, the resultant disruption of homeostasis under
conditions of disease can be detected through analysis of transcripts differentially
expressed in the blood alone. Thus, the identification of several key transcripts or
25 genetic markers in blood will provide information about the genetic state of the cells,
15 tissues, organs and systems of the human body in health and disease.

 The prior art is deficient in non-invasive methods of screening for
30 tissue-specific diseases. The present invention fulfills this long-standing need and
desire in the art.

35 20 SUMMARY OF THE INVENTION

 This present invention discloses a process of using the genetic
40 information contained in human peripheral whole blood in the diagnosis, prognosis
and monitoring of genetic and infectious disease in the human body. The process
25 described herein requires a simple blood sample and is, therefore, non-invasive
45 compared to conventional practices used to detect tissue specific disease, such as
biopsies.

5 One object of the present invention is to provide a non-invasive method for the diagnosis, prognosis and monitoring of genetic and infectious disease in humans and animals.

10 In one embodiment of the present invention, there is provided a method for detecting expression of a gene in blood from a subject, comprising the steps of: a) quantifying RNA from a subject blood sample; and b) detecting expression of the gene in the quantified RNA, wherein the expression of the gene in
15 quantified RNA indicates the expression of the gene in the subject blood.

In another embodiment of the present invention, there is provided a
20 method for detecting expression of one or more genes in blood from a subject, comprising the steps of: a) obtaining a subject blood sample; b) extracting RNA from the blood sample; c) amplifying the RNA; d) generating expressed sequence tags (ESTs) from the amplified RNA product; and e) detecting expression of the genes in
25 the ESTs, wherein the expression of the genes in the ESTs indicates the expression of the genes in the subject blood. Preferably, the genes are tissue-specific genes.

In still another embodiment of the present invention, there is provided
30 a method for detecting expression of one or more genes in blood from a subject, comprising the steps of: a) obtaining a subject blood sample; b) extracting DNA fragments from the blood sample; c) amplifying the DNA fragments; and d) detecting
35 20 expression of the genes in the amplified DNA product, wherein the expression of the genes in the amplified DNA product indicates the expression of the genes in the subject blood.

40 In yet another embodiment of the present invention, there is provided a method for monitoring a course of a therapeutic treatment in an individual, comprising the steps of: a) obtaining a blood sample from the individual; b) extracting
45 RNA from the blood sample; c) amplifying the RNA; d) generating expressed sequence tags (ESTs) from the amplified RNA product; e) detecting expression of genes in the ESTs, wherein the expression of the genes is associated with the effect of
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5 the therapeutic treatment; and f) repeating steps a)-e), wherein the course of the
therapeutic treatment is monitored by detecting the change of expression of the genes
in the ESTs. Such a method may also be used for monitoring the onset of overt
10 symptoms of a disease, wherein the expression of the genes is associated with the
5 onset of the symptoms.

In still yet another embodiment of the present invention, there is
provided a method for diagnosing a disease in a test subject, comprising the steps of:
15 a) generating a cDNA library for the disease from a whole blood sample from a
normal subject; b) generating expressed sequence tag (EST) profile from the normal
subject cDNA library; c) generating a cDNA library for the disease from a whole
20 blood sample from a test subject; d) generating EST profile from the test subject
cDNA library; and e) comparing the test subject EST profile to the normal subject
EST profile, wherein if the test subject EST profile differs from the normal subject
25 EST profile, the test subject might be diagnosed with the disease.

15 In still yet another embodiment of the present invention, there is
provided a kit for diagnosing, prognosing or predicting a disease, comprising: a) gene-
specific primers; wherein the primers are designed in such a way that their sequences
contain the opposing ends of two adjacent exons for the specific gene with the intron
sequence excluded; and b) a carrier, wherein the carrier immobilizes the primer(s).
30 Such a kit may be applied to a test subject whole blood sample to diagnose, prognose
or predict a disease.

In yet another embodiment of the present invention, there is provided a
40 kit for diagnosing, prognosing or predicting a disease, comprising: a) probes derived
from a whole blood sample for a specific disease; and b) a carrier, wherein the carrier
25 immobilizes the probes. Such a kit may be applied to a test subject whole blood
sample to diagnose, prognose or predict a disease.

Furthermore, the present invention provides a cDNA library specific
for a disease, wherein the cDNA library is generated from whole blood samples.

5 Other and further aspects, features, and advantages of the present invention will be apparent from the following description of the presently preferred embodiments of the invention. These embodiments are given for the purpose of disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

15 So that the matter in which the above-recited features, advantages and objects of the invention, as well as others which will become clear, are attained and can be understood in detail, more particular descriptions of the invention briefly summarized above may be had by reference to certain embodiments thereof which are illustrated in the appended drawings. These drawings form a part of the specification. It is to be noted, however, that the appended drawings illustrate preferred embodiments of the invention and therefore are not to be considered limiting in their scope. not be considered to limit the scope of the invention.

30 **Figure 1** shows the following RNA samples prepared from human blood; **Figure 1A**: Lane 1, Molecular weight marker; Lane 2, RT-PCR on APP gene; Lane 3, PCR on APP gene; Lane 4, RT-PCR on APC gene; Lane 5, PCR on APC gene; **Figure 1B**: Lanes 1 and 2, RT-PCR and PCR of β MyHC, respectively; Lanes 3 and 4, RT-PCR of β MyHC from RNA prepared from human fetal and human adult heart, respectively; Lane 5, Molecular weight marker.

40 **Figure 2** shows quantitative RT-PCR analysis performed on RNA samples extracted from a drop of blood. Forward primer (5'-GCCCTCTGGGGACCTGAC-3', SEQ ID No. 1) of exon 1 and reverse primer (5'-CCCACCTGCAGGTCCTCT-3', SEQ ID No. 2) of exons 1 and 2 of insulin gene. Blood samples of 4 normal subjects were assayed. Lanes 1, 3, 5 and 7 represent overnight "fasting" blood sample and lanes 2, 4, 6 and 8 represent "non-fasting" samples.

5 **Figure 3** shows quantitative RT-PCR analysis performed on RNA samples extracted from a drop of blood. Lanes 1 and 2 represent normal healthy person and lane 3 represents late-onset diabetes (Type II) and lane 4 represents asymptomatic diabetes.

10 **Figure 4** shows multiple RT-PCR assay in a drop of blood. Primers were derived from insulin gene (INS), zinc-finger protein gene (ZFP) and house-keeping gene (GADH). Lane 1 represents normal person. Lane 2 represents late-onset diabetes and lane 3 represents asymptomatic diabetes.

15 **Figure 5** shows standardized levels of insulin gene (**Figure 5A**) and ZFP gene (**Figure 5B**) expressed in a drop of blood. The first three subjects were normal, second two subjects showed normal glucose tolerance, and the last subject had late onset diabetes type II. **Figure 5C** shows standardized levels of insulin gene expressed in each fractionated cell from whole blood.

20 **Figure 6** shows the differential screening of human blood cell cDNA library with different cDNA probes of heart and brain tissue. **Figure 6A** shows blood cell cDNA probes vs. adult heart cDNA probes. **Figure 6B** shows blood cell cDNA probes vs. human brain cDNA probes.

25 **Figure 7** graphically shows the 1,800 unique genes in human blood and in the human fetal heart grouped into seven cellular functions.

30 **DETAILED DESCRIPTION OF THE INVENTION**

35 In accordance with the present invention, there may be employed conventional molecular biology, microbiology, and recombinant DNA techniques within the skill of the art. Such techniques are explained fully in the literature. See, 40 e.g., Sambrook, Fritsch & Maniatis, "Molecular Cloning: A Laboratory Manual (1982); "DNA Cloning: A Practical Approach," Volumes I and II (D.N. Glover ed. 1985); "Oligonucleotide Synthesis" (M.J. Gait ed. 1984); "Nucleic Acid 45

5 Hybridization" [B.D. Hames & S.J. Higgins eds. (1985)]; "Transcription and
Translation" [B.D. Hames & S.J. Higgins eds. (1984)]; "Animal Cell Culture" [R.I.
Freshney, ed. (1986)]; "Immobilized Cells And Enzymes" [IRL Press, (1986)]; B.
10 Perbal, "A Practical Guide To Molecular Cloning" (1984). Therefore, if appearing
5 herein, the following terms shall have the definitions set out below.

A "cDNA" is defined as copy-DNA or complementary-DNA, and is a
product of a reverse transcription reaction from an mRNA transcript. "RT-PCR"
15 refers to reverse transcription polymerase chain reaction and results in production of
cDNAs that are complementary to the mRNA template(s).

10 The term "oligonucleotide" is defined as a molecule comprised of two
or more deoxyribonucleotides, preferably more than three. Its exact size will depend
upon many factors which, in turn, depend upon the ultimate function and use of the
oligonucleotide. The term "primer" as used herein refers to an oligonucleotide,
25 whether occurring naturally as in a purified restriction digest or produced
synthetically, which is capable of acting as a point of initiation of synthesis when
placed under conditions in which synthesis of a primer extension product, which is
complementary to a nucleic acid strand, is induced, i.e., in the presence of nucleotides
30 and an inducing agent such as a DNA polymerase and at a suitable temperature and
pH. The primer may be either single-stranded or double-stranded and must be
sufficiently long to prime the synthesis of the desired extension product in the
35 presence of the inducing agent. The exact length of the primer will depend upon
many factors, including temperature, source of primer and the method used. For
40 example, for diagnostic applications, depending on the complexity of the target
sequence, the oligonucleotide primer typically contains 15-25 or more nucleotides,
25 although it may contain fewer nucleotides. The factors involved in determining the
appropriate length of primer are readily known to one of ordinary skill in the art.

45 As used herein, random sequence primers refer to a composition of
primers of random sequence, i.e. not directed towards a specific sequence. These

5 sequences possess sufficient complementary to hybridize with a polynucleotide and
the primer sequence need not reflect the exact sequence of the template.

10 "Restriction fragment length polymorphism" refers to variations in
DNA sequence detected by variations in the length of DNA fragments generated by
5 restriction endonuclease digestion.

15 A standard Northern blot assay can be used to ascertain the relative
amounts of mRNA in a cell or tissue obtained from plant or other tissue, in
accordance with conventional Northern hybridization techniques known to those
persons of ordinary skill in the art. The Northern blot uses a hybridization probe, e.g.
20 radiolabelled cDNA, either containing the full-length, single stranded DNA or a
fragment of that DNA sequence at least 20 (preferably at least 30, more preferably at
least 50, and most preferably at least 100 consecutive nucleotides in length). The
DNA hybridization probe can be labelled by any of the many different methods
25 known to those skilled in this art. The labels most commonly employed for these
studies are radioactive elements, enzymes, chemicals which fluoresce when exposed
to ultraviolet light, and others. A number of fluorescent materials are known and can
be utilized as labels. These include, for example, fluorescein, rhodamine, auramine,
30 Texas Red, AMCA blue and Lucifer Yellow. A particular detecting material is anti-
rabbit antibody prepared in goats and conjugated with fluorescein through an
isothiocyanate. Proteins can also be labeled with a radioactive element or with an
enzyme. The radioactive label can be detected by any of the currently available
counting procedures. The preferred isotope may be selected from ^3H , ^{14}C , ^{32}P , ^{35}S ,
40 ^{36}Cl , ^{51}Cr , ^{57}Co , ^{58}Co , ^{59}Fe , ^{90}Y , ^{125}I , ^{131}I , and ^{186}Re . Enzyme labels are likewise
useful, and can be detected by any of the presently utilized colorimetric,
25 spectrophotometric, fluorospectrophotometric, amperometric or gasometric
techniques. The enzyme is conjugated to the selected particle by reaction with
bridging molecules such as carbodiimides, diisocyanates, glutaraldehyde and the like.
45 Many enzymes which can be used in these procedures are known and can be utilized.

5 The preferred are peroxidase, β -glucuronidase, β -D-glucosidase, β -D-galactosidase, urease, glucose oxidase plus peroxidase and alkaline phosphatase. U.S. Patent Nos. 3,654,090, 3,850,752, and 4,016,043 are referred to by way of example for their disclosure of alternate labeling material and methods.

10 5 As used herein, "individual" refers to human subjects as well as non-human subjects. The examples herein are not meant to limit the methodology of the present invention to human subjects only, as the instant methodology is useful in the fields of veterinary medicine, animal sciences and such.

15 In one embodiment of the present invention, there is provided a method for detecting expression of a gene in blood from a subject, comprising the steps of: a) quantifying RNA from a subject blood sample; and b) detecting expression of the gene in the quantified RNA, wherein the expression of the gene in quantified RNA indicates the expression of the gene in the subject blood. An example of the quantifying method is by mass spectrometry.

20 15 In another embodiment of the present invention, there is provided a method for detecting expression of one or more genes in blood from a subject, comprising the steps of: a) obtaining a subject blood sample; b) extracting RNA from the blood sample; c) amplifying the RNA; d) generating expressed sequence tags (ESTs) from the amplified RNA product; and e) detecting expression of the genes in the ESTs, wherein the expression of the genes in the ESTs indicates the expression of the genes in the subject blood. Preferably, the subject is a fetus, an embryo, a child, an adult or a non-human animal. The genes are non-cancer-associated and tissue-specific genes. Still preferably, the amplification is performed by RT-PCR using random sequence primers or gene-specific primers.

25 20 In still another embodiment of the present invention, there is provided a method for detecting expression of one or more genes in blood from a subject, comprising the steps of: a) obtaining a subject blood sample; b) extracting DNA fragments from the blood sample; c) amplifying the DNA fragments; and d) detecting

5 expression of the genes in the amplified DNA product, wherein the expression of the
genes in the amplified DNA product indicates the expression of the genes in the
subject blood.

10 In yet another embodiment of the present invention, there is provided a
5 method for monitoring a course of a therapeutic treatment in an individual,
comprising the steps of: a) obtaining a blood sample from the individual; b) extracting
RNA from the blood sample; c) amplifying the RNA; d) generating expressed
15 sequence tags (ESTs) from the amplified RNA product; e) detecting expression of
genes in the ESTs, wherein the expression of the genes is associated with the effect of
the therapeutic treatment; and f) repeating steps a)-e), wherein the course of the
20 therapeutic treatment is monitored by detecting the change of expression of the genes
in the ESTs. Such a method may also be used for monitoring the onset of overt
symptoms of a disease, wherein the expression of the genes is associated with the
25 onset of the symptoms. Preferably, the amplification is performed by RT-PCR, and
15 the change of the expression of the genes in the ESTs is monitored by sequencing the
ESTs and comparing the resulting sequences at various time points; or by performing
single nucleotide polymorphism analysis and detecting the variation of a single
30 nucleotide in the ESTs at various time points.

In still yet another embodiment of the present invention, there is
35 20 provided a method for diagnosing a disease in a test subject, comprising the steps of:
a) generating a cDNA library for the disease from a whole blood sample from a
normal subject; b) generating expressed sequence tag (EST) profile from the normal
40 subject cDNA library; c) generating a cDNA library for the disease from a whole
blood sample from a test subject; d) generating EST profile from the test subject
25 cDNA library; and e) comparing the test subject EST profile to the normal subject
EST profile, wherein if the test subject EST profile differs from the normal subject
45 EST profile, the test subject might be diagnosed with the disease.

5 In still yet another embodiment of the present invention, there is
provided a kit for diagnosing, prognosing or predicting a disease, comprising: a) gene-
specific primers; wherein the primers are designed in such a way that their sequences
10 contain the opposing ends of two adjacent exons for the specific gene with the intron
sequence excluded; and b) a carrier, wherein the carrier immobilizes the primer(s).
5 Preferably, the gene-specific primers are selected from the group consisting of insulin-
specific primers, atrial natriuretic factor-specific primers, zinc finger protein gene-
specific primers, beta-myosin heavy chain gene-specific primers, amyloid precursor
15 protein gene-specific primers, and adenomatous polyposis-coli protein gene-specific
primers. Further preferably, the gene-specific primers are selected from the group
20 consisting of SEQ ID Nos. 1 and 2; and SEQ ID Nos. 5 and 6. Such a kit may be
applied to a test subject whole blood sample to diagnose, prognose or predict a disease
by detecting the quantitative expression levels of specific genes associated with the
25 disease in the test subject and then comparing to the levels of same genes expressed in
a normal subject. Such a kit may also be used for monitoring a course of therapeutic
treatment or monitoring the onset of overt symptoms of a disease.

30 In yet another embodiment of the present invention, there is provided a
kit for diagnosing, prognosing or predicting a disease, comprising: a) probes derived
from a whole blood sample for a specific disease; and b) a carrier, wherein the carrier
35 20 immobilizes the probes. Such a kit may be applied to a test subject whole blood
sample to diagnose, prognose or predict a disease by detecting the quantitative
expression levels of specific genes associated with the disease in the test subject and
then comparing to the levels of same genes expressed in a normal subject. Such a kit
40 may also be used for monitoring a course of therapeutic treatment or monitoring the
onset of overt symptoms of a disease.
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45 Furthermore, the present invention provides a cDNA library specific
for a disease, wherein the cDNA library is generated from whole blood samples.

5 The following examples are given for the purpose of illustrating
various embodiments of the invention and are not meant to limit the present invention
in any fashion.

10 5 **EXAMPLE 1**

15 **Construction of a cDNA library**

RNA extracted from human tissues (including fetal heart, adult heart,
liver, brain, prostate gland and whole blood) were used to construct unidirectional
10 cDNA libraries. The first mammalian heart cDNA library was constructed as early as
20 1982. Since then, the methodology has been revised and optimal conditions have
been developed for construction of human heart and hematopoietic progenitor cDNA
libraries (Liew *et al.*, 1984; Liew 1993, Claudio *et al.*, 1998). Most of the novel genes
25 which were identified by sequence annotation can now be obtained as full length
15 transcripts.

30 **EXAMPLE 2**

35 **Catalogue of blood cell ESTs**

20 Random partial sequencing of expressed sequence tags (ESTs) of
cDNA clones from the blood cell library was carried out to establish an EST database
of blood. The known genes as derived from the ESTs were categorized into seven
40 major cellular functions (Hwang, Dempsey *et al.*, 1997).

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EXAMPLE 3

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Differential screening of cDNA library

5 cDNA probes generated from transcripts of each tissue were used to hybridize the blood cell cDNA clones (Liew *et al.*, 1997). The "positive" signals which were hybridized with ³²P-labelled cDNA probes were defined as genes which shared identity with blood and respective tissues. The "negative" spots which were not exposed to ³²P-labelled cDNA probes were considered to be blood-cell-enriched or
10 low frequency transcripts.

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EXAMPLE 4

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Reverse transcriptase-polymerase chain reaction (RT-PCR) assay

15 RNA extracted from samples of human tissue was used for RT-PCR analysis (Jin *et al.* 1990). Three pairs of forward and reverse primers were designed for human cardiac beta-myosin heavy chain gene (β MyHC), amyloid precursor protein (APP) gene and adenomatous polyposis-coli protein (APC) gene. The PCR products were also subjected to automated DNA sequencing to verify the sequences as
20 derived from the specific transcripts of blood.

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EXAMPLE 5

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Detection of tissue specific gene expression in human blood using RT-PCR

25 The beta-myosin heavy chain gene (β MyHC) transcript (mRNA) is known to be highly expressed in ventricles of the human heart. This sarcomeric protein is important for heart muscle contraction and its presence would not be expected in other non-muscle tissues and blood. In 1990, the gene for human cardiac
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5 β MyHC was completely sequenced (Liew *et al.* 1990) and was comprised of 4 exons
and 42 introns.

10 The method of reverse transcription polymerase chain reaction (RT-PCR) was used to determine whether this cardiac specific mRNA is also present in
5 human blood. A pair of primers was designed; the forward primer (SEQ ID No. 3) was on the boundary of exons 21 and 22, and the reverse primer (SEQ ID No. 4) was on the boundary of exons 24 and 25. This region of mRNA is only present in β MyHC
15 and is not found in the alpha-myosin heavy chain gene (α MyHC).

A blood sample was first treated with lysing buffer and then undergone
10 centrifuge. The resulting pellets were further processed with RT-PCR. RT-PCR was performed using the total blood cell RNA as a template. A nested PCR product was generated and used for sequencing. The sequencing results were subjected to BLAST
20 and the identity of exons 21 to 25 was confirmed to be from β MyHC (Figure 1A).

25 Using the same method just described, two other tissue specific genes - amyloid precursor protein (APP, forward primer, SEQ ID No. 7; reverse primer, SEQ ID No. 8) found in the brain and associated with Alzheimer's disease, and
30 adenomatous polyposis coli protein (APC) found in the colon and rectum and associated with colorectal cancer (Grodén *et al.* 1991; Santoro and Grodén 1997) - were also detected in the RNA extracted from human blood (Figure 1B).

20 EXAMPLE 6

40 Multiple RT-PCR analysis on a drop of blood from a normal/diseased individual

A drop of blood was extracted to obtain RNA to carry out quantitative
25 RT-PCR analysis. Specific primers for the insulin gene were designed: forward primer (5'-GCCCTCTGGGGACCTGAC-3', SEQ ID No. 1) of exon 1 and reverse
45 primer (5'-CCCACCTGCAGGTCCTCT-3'', SEQ ID No. 2) of exons 1 and 2 of insulin gene. Such reverse primer was obtained by deleting the intron between the
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5 exons 1 and 2. Blood samples of 4 normal subjects were assayed. It was found that
the insulin gene is expressed in the blood and the quantitative expression of the
10 insulin gene in a drop of blood is influenced by fasting and non-fasting states of
normal healthy subjects (Figure 2). This very low level of expression of the insulin
5 gene reflects the phenotypic status of a person and strongly suggests that there is a
physiological and pathological role for its expression, contrary to the basal or
illegitimate theory of transcription suggested by Chelly *et al.* (1989) and Kimoto
15 (1998).

Same quantitative RT-PCR analysis was performed using insulin
10 specific primers on RNA samples extracted from a drop of blood from a normal
20 healthy person, a person having late-onset diabetes (Type II) and a person having
asymptomatic diabetes. It was found that the insulin gene is expressed differentially
amongst subjects that are healthy, diagnosed as type II diabetic, and also in an
25 asymptomatic preclinical patient (Figure 3).

15 Similarly, specific primers for the atrial natriuretic factor (ANF) gene
were designed (forward primer, SEQ ID No. 5; reverse primer, SEQ ID No. 6) and
30 RT-PCR analysis was performed on a drop of blood. ANF is known to be highly
expressed in heart tissue biopsies and in the plasma of heart failure patients.
However, atrial natriuretic factor was observed to be expressed in the blood and the
35 20 expression of the atrial natriuretic factor gene is significantly higher in the blood of
patients with heart failure as compared to the blood of a normal control patient.

Specific primers for the zinc finger protein gene (ZFP, forward primer,
40 SEQ ID No. 9; reverse primer, SEQ ID No. 10) were also designed and RT-PCR
analysis was performed on a drop of blood. ZFP is known to be high in heart tissue
25 biopsies of cardiac hypertrophy and heart failure patients. In the present study, the
45 expression of ZFP was observed in the blood as well as differential expression levels
of ZFP amongst the normal, diabetic and asymptomatic preclinical subjects (Figure
4); although neither of the non-normal subjects has been specifically diagnosed as
50

5 suffering from cardiac hypertrophy and/or heart failure, the higher expression levels
of the ZFP gene in their blood may indicate that these subjects are headed in that
general direction.

10 It was hypothesized that a housekeeping gene such as glyceraldehyde
5 dehydrogenase (GADH) which is required and highly expressed in all cells would not
be differentially expressed in the blood of normal vs. disease subjects. This
hypothesis was confirmed by RT-PCR using GADH specific primers (Figure 4).
15 Thus, GADH is useful as an internal control.

Standardized levels of insulin gene or ZFP gene expressed in a drop of
10 blood were estimated using a housekeeping gene as an internal control relative to
insulin or ZFP expressed (Figures 5A & 5B). The levels of insulin gene expressed in
20 each fractionated cell from whole blood were also standardized and shown in Figure
5C.

15 EXAMPLE 7

30 Human blood cell cDNA library

In order to further substantiate the present invention, differential
screening of the human blood cell cDNA library was conducted. cDNA probes
35 20 derived from human blood, adult heart or brain were respectively hybridized to the
human blood cDNA library clones. As shown in Figure 7, more than 95% of the
"positively" identified clones are identical between the blood and other tissue
40 samples.

DNA sequencing of randomly selected clones from the human whole
25 blood cell cDNA library was also performed. This allowed information regarding the
cellular function of blood to be obtained concurrently with gene identification. More
45 than 20,000 expressed sequence tags (ESTs) have been generated and characterized to
date, 17.6% of which did not result in a statistically significant match to entries in the

GenBank databases and thus were designated as "Novel" ESTs. These results are summarized in Figure 7 together with the seven cellular functions related to percent distribution of known genes in blood and in the fetal heart.

From 20,000 ESTs, 1,800 have been identified as known genes which may not all appear in the hemopoietic system. For example, the insulin gene and the atrial natriuretic factor gene have not been detected in these 20,000 ESTs but their transcripts were detected in a drop of blood, strongly suggesting that all transcripts of the human genome can be detected by performing RT-PCR analysis on a drop of blood.

In addition, approximately 400 novel genes have been identified from the 20,000 ESTs characterized to date, and these will be subjected to full length sequencing and open reading frame alignment to reduce the actual number of novel ESTs prior to screening for disease markers.

Analysis of the approximately 6,283 ESTs which have known matches in the GenBank databases revealed that this dataset represents over 1,800 unique genes. These genes have been catalogued into seven cellular functions. Comparisons of this set of unique genes with ESTs derived from human brain, heart, lung and kidney demonstrated a greater than 50% overlap in expression (Table 1).

TABLE 1

Overlap of Genes Expressed in Blood *

<u>Tissues</u>	<u>ESTs**</u>	<u>Overlap in Blood</u>
brain	134,000	60%
heart	65,000	59%
lung	60,200	58%
kidney	32,300	54%

* Estimated from limited known genes of about 1,800 as derived from the database of 6,297 ESTs from human blood cell library.

** Obtained from the National Centre of Biotechnology Information (NCBI), U.S.A.

EXAMPLE 8

Blood cell ESTs

The results from the differential screening clearly indicate that the transcripts expressed in the whole blood are reflective of genes expressed in all cells and tissues of the body. More than 95% of detectable spots were identical from two different tissues. The remaining 5% of spots may represent cell- or tissue-specific transcripts; however, results obtained from partial sequencing to generate ESTs of these clones revealed most of them not to be cell- or tissue-specific transcripts. Therefore, the negative spots are postulated to be reflective of low abundance transcripts in the tissue from which the cDNA probes were derived.

An alternative approach that was employed to identify transcripts expressed at low levels is the large-scale generation of expressed sequence tags (ESTs). There is substantial evidence regarding the efficiency of this technology to detect previously characterized (known) and uncharacterized (unknown or novel) genes expressed in the cardiovascular system (Hwang & Dempsey *et al.*, 1997). In the present invention, 20,000 ESTs have been produced from a human blood cell cDNA library and resulted in the identification of approximately 1,800 unique known genes (Table 2)

In the most recent GenBank release, analysis of more than 300,000 ESTs in the database (dbESTs) generated more than 48,000 gene clusters which are thought to represent approximately 50% of the genes in the human genome. Only 4,800 of the dbESTs are blood-derived. In the present invention, 20,000 ESTs have

5 been obtained to date from a human blood cDNA library, which provides the world's
most informative database with respect to blood cell transcripts. From the limited
amount of information generated so far (i.e. 1,800 unique genes), it has already been
10 determined that more than 50% of the transcripts are found in other cells or tissues of
5 the human body (Table 2). Thus, it is expected that by increasing the number of ESTs
generated, more genes will be identified that have an overlap in expression between
the blood and other tissues. Furthermore, the transcripts for several genes which are
15 known to have tissue-restricted patterns of expression (i.e. β MyHC, APP, APC, ANF,
ZFP) have also been demonstrated to be present in blood.

10 Most recently, a cDNA library of human hematopoietic progenitor
stem cells has also been constructed. From the limited set of 1,000 ESTs, there are at
20 least 200 known genes that are shared with other tissue related genes (Claudio *et al.*
1998).

25 Table 2 demonstrates the expression of known genes of specific tissues
15 in blood cells. Previously, only the presence of "housekeeping" genes would have
been expected. Additionally, the presence of at least 25 of the currently known 500
30 genes corresponding to molecular drug targets was detected. These molecular drug
targets are used in the treatment of a variety of diseases which involve inflammation,
renal and cardiovascular function, neoplastic disease, immunomodulation and viral
35 20 infection (Drews & Ryser, 1997). It is expected that additional novel ESTs will
represent future molecular drug targets.

TABLE 2

Comparison of 1,800 Unique Genes Identified in the Blood Cell cDNA Library to
Genes Previously Identified in Specific Tissues

Gene Identification	No. of ESTs	Accession No.	Tissue Distribution					
			Bl	Br	H	K	Li	Lu
100 kDa coactivator	2	U22055		+				+
10kD protein (BC10)	2	AF053470		+	+		+	+
14-3-3 epsilon	2	U54778		+	+			+
14-3-3 protein	11	U28584		+	+		+	
15 kDa selenoprotein (SEP15)	1	AF051894		+	+			+
1-phosphatidylinositol-4-phosphate 5-kinase isoform C	1	S78798						
23 kD highly basic protein	21	X56932	+	+	+	+	+	+
2-5A-dependent RNase	1	L10381						
2'-5' oligoadenylate synthetase 2 (OAS2)	4	M87284	B					
26S proteasome subunit 11	1	AF086708						
36 kDa phosphotyrosine protein	2	AJ223280	T		+			
3-7 gene product (non-exact 86%aa)	1	D64159						
3-phosphoglycerate dehydrogenase (PGAD)	1	AF006043	T	+	+			+
3-prime-phosphoadenosine 5-prime-phosphosulfate synthase 1 (FAPSS1)	2	U53447	+	+	+	+		+
46kd mannose 6-phosphate receptor (MPR46) (low match)	1	X56257						
5-aminoimidazole-4-carboxamide ribonucleotide transformylase	1	D89976						
5-nucleotidase	3	D38524	T	+			+	
6-phosphofructo-2-kinase/fructose-2,6-bisphosphatase 4 (PFKFB4)	1	D49818		+				
6-phosphofructo-2-kinase/fructose-2,6-bisphosphatase (PF2K)	1	AF041829						
71 kd heat shock cognate protein hsc70	23	Y00371						
75 kDa membrane protein (P76)	2	U81006		+	+	+	+	+
8-oxoguanine DNA glycosylase (OGG1)	1	U96710	B				+	+
a disintegrin and metalloprotease domain 10 (ADAM10)	1	AF009615	T				+	
a disintegrin and metalloprotease domain 8 (ADAM8)	1	D26579	B	+				
A kinase anchor protein 95 (AKAP95)	2	Y11997	B, T activated		+			+
A kinase anchor protein, 149kD (AKAP149)	2	X97335		+	+	+		+

5	A4 differentiation-dependent protein (A4), triple LIM domain protein (LMO6), and synaptophysin (SYP); calcium channel alpha-1 subunit (CACNA1F)	1	U83305									
	ABL and putative M8804 Met protein	1	U07561									
10	Absent in melanoma 1 (AIM1)	1	U83115	+	+					+		
	accessory proteins BAP31/BAP29 (DXS1357E)	2	Z31696		+	+						
15	acetyl-Coenzyme A acyltransferase (peroxisomal 3-oxoacyl-Coenzyme A thiolase) (ACAA)	2	X12956	+	+	+	+	+	+			
	acetyl-Coenzyme A transporter (ACATN)	1	D88152	T lymphoma	+	+						
	acidic 82 kDa protein	4	U15552									
	acidic protein rich in leucines (SSP29)	1	Y07969	B	+	+			+	+		
20	Aconitase 2, mitochondrial (ACO2)	1	U80040	+	+	+	+			+		
	actin binding protein MAYVEN	1	AF059559									
	actin, beta (ACTB)	158	X04098	T, B	+	+			+			
	actin, beta (ACTB) (non-exact, low match 73%)	1	M10277									
	actin, gamma (low score)	1	K00791									
25	actin, gamma 1 (ACTG1)	4	X04098	+	+	+	+	+	+		high in many libraries	
	actin-binding LIM protein (ABLM)	4	D31883		+	+	+			+		
	Actinin, alpha 1 (ACTN1)	8	M95178		+	+	+			+		
	actinin, alpha 4 (ACTN4)	1	D89980		+	+			+			
	activated p21cdc42Hs kinase (ACK)	1	L13738	B	+					+		
30	activated RNA polymerase II transcription cofactor 4 (PC4)	1	X79805	+	+	+	+			+		
	activating transcription factor 1 (ATF1)	1	X55544			+						
	activating transcription factor 2 (ATF2)	1	X15875		+	+			+			
35	activating transcription factor 4 (tax-responsive enhancer element B67) (ATF4)	2	M86842						+	+		
	active BCR-related gene (ABR)	1	U01147	+	+	+	+			+		
	acyl-CoA oxidase (AOX)	1	U03254									
40	acyl-Coenzyme A dehydrogenase, C-4 to C-12 straight chain (ACADM)	2	M16827									
	acyl-Coenzyme A dehydrogenase, very long chain (ACADVL)	3	D43682	+	+	+	+	+	+	+		
	acyloxyacyl hydrolase (neutrophil) (AOAH)	3	M62840	T		+			+	+		
45	adaplin, delta (ADTD)	2	U91930		+	+			+			
	adaplin, delta (ADTD) (non-exact 59%)	1	AC005328									
	adaplin, gamma (ADTG)	1	Y12226		+	+	+			+		
	adaptor complex sigma3B (AP3S3)	2	X99459		+		+			+		
	adaptor protein p150	1	Y08991									
50	adducin 1 (alpha) (ADD1)	2	L07261		+	+			+			

5	adducin 1 (alpha) (add1)	3	L29296	+	+	+	+	+	+	
	adducin 3 (gamma) (ADD3)	3	U37122	B, W	+	+	+	+	+	
	adenine nucleotide translocator 2 (fibroblast) (ANT2)	2	M57424		+	+		+		
	adenine nucleotide translocator 2 (fibroblast) (ANT2) (non-exact 81%)	1	J02683							
10	adenine nucleotide translocator 2 (fibroblast) (ANT2) (non-exact, 79%)	1	J02683							
	adenine nucleotide translocator 2 (fibroblast) (ANT2) (non-exact, 86%)	1	J02683							
15	adenine nucleotide translocator 3 (liver) (ANT3)	3	J03592		+	+		+	+	
	adenosine deaminase, RNA-specific (ADAR)	6	U18121		+	+		+		
	adenylate cyclase 3 (ADCY3)	2	AF033861		+	+	+	+	+	
	adenylate cyclase 7 (ADCY7)	1	D25538							
20	adenylate kinase 2 (AK2)	2	U39945		+	+		+	+	
	adenylate kinase 3 (AK3) (non-exact, 67%)	1	X80673							
	adenylyl cyclase-associated protein (CAP)	28	M98474	I		+		+		
	adipose differentiation-related protein; adipophilin (ADFP)	1	X97324			+		+	+	
25	ADP-ribosylation factor 1 (ARF1)	13	M84326		+	+		+	+	
	ADP-ribosylation factor 3 (ARF3)	2	M33384		+	+		+		
	ADP-ribosylation factor 4 (ARF4)	1	M36341	T lymphoma	+	+			+	
	ADP-ribosylation factor 5 (ARF5)	1	M57567			+	+	+	+	
30	ADP-ribosylation factor domain protein 1, 64kD (ARFD1)	1	L04510		+					
	ADP-ribosyltransferase (NAD ⁺ ; poly (ADP-ribose) polymerase) (ADPRT)	4	M32721	+	+	+	+	+	+	
	adrenergic, beta, receptor kinase 1 (ADRBK1)	2	X61157	B	+			+		
35	adrenoleukodystrophy-like 1 (ALDL1)	1	AJ000327							
	AE-binding protein 1 (AEBP1) (non-exact, 62%)	1	D86479							
	AF-17	1	U07932							
	A-gamma-globin	1	V00514							
40	A-gamma-globin (chromosome 11 allele)	1	J00176							
	agamaglobulinaemia tyrosine kinase (ATK)	1	U78027							
	AHNAK nucleoprotein (desmoyokin) (AHNAK)	4	M80899	+	+	+	+		+	
	alanine (membrane) aminopeptidase (aminopeptidase N, aminopeptidase M, microsomal aminopeptidase, CD13, p150) (ANPEP)	1	X13276			+		+		
45	alcohol dehydrogenase 5 (class III), chi polypeptide (ADH5)	1	M29872							
	aldehyde dehydrogenase 1, soluble (ALDH1)	1	AF003341		+			+	+	
50										

5	aldehyde dehydrogenase 10 (fatty aldehyde dehydrogenase) (ALDH10)	2	U75286									
	aldehyde reductase 1 (low Km aldose reductase) (ALDR1)	3	J04795	B	+	+	+	+				
	aldo-keto reductase family 1, member A1 (aldehyde reductase) (AKR1A1)	2	J04794	B	+	+		+				
10	aldo-keto reductase family 1, member C3 (3-alpha hydroxysteroid dehydrogenase, type II) (AKR1C3)	1	D17793		+	+	+			+		
	aldo-keto reductase family 7, member A2 (afatoxin aldehyde reductase) (AKR7A2)	1	Y16675		+	+			+	+		
15	aldolase A, fructose-bisphosphate (ALDOA)	7	X12447		+	+			+			
	aldolase C, fructose-bisphosphate (ALDOC)	2	X05195		+	+			+			
	alkaline phosphatase, liver/bone/kidney (ALPL)	1	4502062									
20	ALL-1 (FL04731;L04284 HRX)	4	Z69780									
	alpha mannosidase II isozyme	1	D55649		+					+		
	alpha thalassemia/mental retardation syndrome X-linked (ATRX)	3	U75653	+	+	+	+	+		+		
	alpha-2 macroglobulin	1	Z11711									
25	alpha-2-globin	2	V00516									
	alpha-2-macroglobulin receptor/lipoprotein receptor protein (A2MR/LRP)	1	U06985									
	alpha-polypeptide of N-acetyl-alpha-glucosaminidase (HEXA)	1	M13520									
30	alpha-spectrin	1	X86901									
	alpha-subunit of G12 a (GTP-binding signal transduction protein)	1	X07854									
	aminin receptor 1 (67kD); Ribosomal protein SA (LAMR1)	2	J03799	T	+	+			+	+		
35	aminolevulinate, delta-, dehydratase (ALAD)	1	X64467		+							
	amino-terminal enhancer of split (AES)	2	X73358	+	+	+	+			+		
	amino-terminal enhancer of split (AES)	3	U04241	B	+	+			+	+		
	AMP deaminase isoform L (AMPD2)	8	M91029		+					+		
40	amphiphysin (Stiff-Mann syndrome with breast cancer 128kD autoantigen) (AMPH)	1	U07616	B	+					+		
	amphiphysin (Stiff-Mann syndrome with breast cancer 128kD autoantigen) (AMPH)(non-exact, 68%)	1	U07616									
45	amphiphysin (Stiff-Mann syndrome with breast cancer 128kD autoantigen) (AMPH)(non-exact, 68%)	1	U07616									
	amphiphysin II	4	U87558		+	+			+			
	amphiphysin II (67%aa amphiphysin?)	1	AF068915									
50	amphiphysin II (non-exact 69% aa)	1	AF001383									

5	amphiphysin-like (AMPHL)	1	U88485		+	+						
	amphiphysin-like (AMPHL) (low match)	1	AF068918									
	AMY-1	1	D50692	B, T					+			
	amyloid beta (A4) precursor protein-binding, family B, member 1 (Fe65) (APBB1)	1	L77864		+	+	+				+	
10	amyloid beta (A4) precursor-like protein 2 (APLP2)	6	L27831	T lymphoma	+	+			+	+		
	ankyrin 3, node of Ranvier (ankyrin G) (ANK) (non- exact, 50%)	1	U43965									
	annexin I (lipocortin I) (ANX1)	1	X05908		+	+	+				+	
15	annexin II	1	D28364									
	annexin II (lipocortin II; calpactin I, heavy polypeptide) (ANX2)	7	D00017	+	+	+	+	+	+	+	+	high in many libraries
	annexin IV (placental anticoagulant protein II) (ANX4)	1	M19383		+	+	+	+	+	+		
20	annexin V (endonexin II) (ANX5)	2	M21731		+	+	+			+		
	annexin V (endonexin II) (ANXV)	1	M19384		+	+	+			+		
	annexin VI (p68) (ANX6)	6	Y00097		+	+	+			+		
	annexin VII (synexin) (ANX7)	1	J04543		+	+	+			+		
25	antigen identified by monoclonal antibodies 12E7, F21 and O13 (MIC2)	2	M16279		+	+	+			+		
	antigen identified by monoclonal antibodies 4F2, TRA1.10, TROP4, and T43 (MDU1)	3	J02939		+	+	+	+	+	+		
	antigen TQ1	1										
30	anti-oxidant protein 2 (non- selenium glutathione peroxidase, acidic calcium- independent phospholipase A2) (KIAA0106)	1	D14662		+	+	+	+	+	+		
	APEX nuclease (multifunctional DNA repair enzyme) (APEX)	5	X66133		+	+			+	+		
35	Apolipoprotein L (APOL) (59%aa)	1	Z82215									
	apoptosis inhibitor 1 (API1)	1	L49431		+	+	+	+	+	+		
	apoptosis inhibitor 4 (survivin) (API4)	1	U75285	B, W	+	+			+			
	apoptosis inhibitor 5 (API5)	1	U83857	T lymphoma	+				+			
	apoptosis specific protein (ASP)	1	Y11588	B	+				+	+		
40	apoptotic protease activating factor (APAF1)	1	AF013263	B	+	+			+			
	aquaporin 3 (AQP3)	1	AB001325	T						+		
	aquaporin 9 (AQP9)	7	AB008775	T activated					+			
	arachidonate 12- lipoxygenase (ALOX12)	1	M58704	T					+	+		
45	arachidonate 5- lipoxygenase-activating protein (ALOX5AP)	3	X52195	+	+		+			+		
	aradine homolog (ARI)	1	AJ008771	+	+	+	+			+		
50	aradine-2 (D. melanogaster) homolog (all-trans retinoic acid inducible RING finger) (ARI2)	1	AF099149	+	+	+	+			+		

5	ARP1 (actin-related protein 1, yeast) homolog A (centractin alpha) (ACTR1A)	1	X82208		+				+		
	ARP2 (actin-related protein 2, yeast) homolog (ACTR2)	9	AF006082		+	+			+	+	
	ARP2/3 protein complex subunit 34 (ARC34)	5	AF006085	I activated, W	+	+			+		
10	Arp2/3 protein complex subunit p41 (ARC41)	6	AF006084	monocyte stimulated	+	+			+		
	Arp2/3 protein complex subunit p41 (ARC41)) (low match)	1	AF006084								
	Arp2/3 protein complex subunit p18 (ARC18)	20	AF017807		+	+			+	+	
	Arp2/3 protein complex subunit p20 (ARC20)	2	AF006087		+	+			+	+	
15	Arp2/3 protein complex subunit p21 (ARC21)	3	AF006086	W					+	+	
	ARP3 (actin-related protein 3, yeast) homolog (ACTR3)	11	AF006083	W		+			+	+	
	arrestin, beta 2 (ARRB2)	1	AF108941	B, T, W	+	+			+		
	arsA (bacterial) arsenite transporter, ATP-binding, homolog 1 (ASNA1)	1	AF047469	B, T	+				+		
20	aryl hydrocarbon receptor nuclear translocator-like (ARNTL)	2	AF044288	B	+	+			+		
	aryl hydrocarbon receptor-interacting protein (AIP)	1	U31913	+	+	+	+			+	
	arylsulfatase A (ARSA)	1	X52151	I activated	+				+		
25	asialoglycoprotein receptor 2 (ASGR2)	1	M11025						+	+	
	asparaginyl-tRNA synthetase (NARS)	3	D84273		+	+			+		
	aspartyl-tRNA synthetase (DARS)	1	J05032	B	+	+			+		
	ataxia telangiectasia mutated (includes complementation groups A, C and D) (ATM)	1	U82828	B, T		+			+		
30	ataxin-2-like protein A2LP (A2LG)	1	AF034373	B, T activated	+	+				+	
	ATF6	1	AF005887		+				+		
	ATP binding cassette transporter (ABCR) (non-exact 80%)	1	U88887								
35	ATP synthase (F1-ATPase) alpha subunit, mitochondrial	1	X59068								
	ATP synthase beta subunit gene	1	M19482								
	ATP synthase, H ⁺ transporting, mitochondrial F0 complex, subunit b, isoform 1 (ATP5F1)	1	X60221	+	+	+	+			+	
40	ATP synthase, H ⁺ transporting, mitochondrial F0 complex, subunit c (subunit 9), isoform 1 (ATP5G1)	1	X69907	I activated	+	+			+	+	
	ATP synthase, H ⁺ transporting, mitochondrial F1 complex, alpha subunit, isoform 1, cardiac muscle (ATP5A1)	3	D14710								
45	ATP synthase, H ⁺ transporting, mitochondrial F1 complex, alpha subunit, isoform 1, cardiac muscle (ATP5A1) (low match)	1	D14710								

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ATP synthase, H ⁺ transporting, mitochondrial F1 complex, beta polypeptide (ATP5B)	2	M27132									
ATP synthase, H ⁺ transporting, mitochondrial F1 complex, gamma polypeptide 1 (ATP5C1)	1	D16563	W	+	+	+	+				
ATP synthase, H ⁺ transporting, mitochondrial F1F0, subunit g (ATP5JG)	1	AF092124	+	+	+	+	+	+			
ATP/GTP-binding protein (HEAB)	2	U73524	+	+	+	+					
ATPase, Ca ⁺⁺ transporting, ubiquitous (ATP2A3)	5	Z69881		+							
ATPase, H ⁺ transporting, lysosomal (vacuolar proton pump) 21kD (ATP6F)	2	D89052	+	+	+	+					
ATPase, H ⁺ transporting, lysosomal (vacuolar proton pump) 31kD (ATP6E)	1	X76228		+	+	+					
ATPase, H ⁺ transporting, lysosomal (vacuolar proton pump) 42kD; Vacuolar proton-ATPase, subunit C; V-ATPase, subunit C (ATP6D)	5	X69151		+	+	+					
ATPase, H ⁺ transporting, lysosomal (vacuolar proton pump), alpha polypeptide, 70kD, isoform 1 (ATP6A1)	3	L09235		+		+					
ATPase, H ⁺ transporting, lysosomal (vacuolar proton pump), beta polypeptide, 56/58kD, isoform 2 (ATP6B2)	6	X62949	+	+	+	+					
ATPase, H ⁺ transporting, lysosomal (vacuolar proton pump), member J (ATP6J)	2	AF038954	+	+	+	+				+	high in testis
ATPase, H ⁺ transporting, lysosomal (vacuolar proton pump), subunit 1 (ATP6S1)	1	D16469		+	+	+					
ATP-binding cassette 50 (TNF-alpha stimulated) (ABC50)	1	AF027302	+	+	+	+					
ATP-binding cassette protein M-ABC1 (mitochondrial)	1	AF047680									
ATP-dependent RNA helicase	1	AJ010840	T lymphoma		+			+			
autoantigen (Hs.75528)	2	L05425	T activated		+						
autoantigen (Hs.75528) (non-exact 84%)	1	L05425									
autoantigen (Hs.75682)	1	U17474	B	+						+	
autoantigen La/SS-B	1	Z35127									
axin (AXIN1)	1	AF009674	T	+							
axonemal dynein heavy chain (DNAH17)	1	AJ000522								+	
BAIT-associated protein 3 (BAIAP3) (non-exact 54%)	1	AB017111									
basement membrane-induced gene (ICB1)	1	AF044896									
basic leucine zipper nuclear factor 1 (JEM-1) (BLZF1)	2	U79751									
basic transcription factor 3 (BTF3)	5	X74070	+	+	+	+	+	+			
basigin (BSG)	1	L10240		+					+		
BC-2	1	AF042384	B		+	+	+				

5	B-cell CLL/lymphoma 6 (zinc finger protein 51) (BCL6)	1	U00115		+	+					
	B-cell translocation gene 1, anti-proliferative (BTG)	1	X61123			+				+	
	BCL2/adenovirus E1B 19kD-interacting protein 2 (BNIP2)	1	U15173	B	+				+	+	
10	BCL2/adenovirus E1B 19kD-interacting protein 3- like (BNIP3L)	2	AF067396		+	+	+		+		
	beclin 1 (coiled-coil, myosin-like BCL2- interacting protein) (BECN1)	1	AF077301	B	+	+		+			
15	beta-1,2-N- acetylglucosaminyltransfer ase II (MGAT2)	2	U15128								
	beta-2-microglobulin (B2M)	63	S82297	+	+	+	+	+	+		high in invasive prostate tumor
	beta-hexosaminidase alpha chain (HEXA)	1	M16411								
	beta-tubulin	7	V00599	+	+	+	+	+	+		high in many libraries
20	beta-tubulin (non-exact, 76%)	1	AF070561								
	beta-tubulin, pseudogene	1	J00315								
	BING4	1	Z97184								
	biotinidase (BTD) (non-exact 62%)	1	U03274								
	biotinidase (BTD) (non- exact 70%)	1	U03274								
25	biotinidase (BTD) (non- exact, 56%)	1	U03274								
	BIOTINIDASE PRECURSOR	1	P43251								
	biphenyl hydrolase-like (serine hydrolase) (BPHL)	1	X81372		+				+		
	bone marrow stromal cell antigen 1 (BST1)	1	D21878						+		
30	box-dependent myc- interacting protein isoform BIN1-10 (BIN1)	1	AF043900								
	box-dependent myc- interacting protein isoform BIN1-10 (BIN1) (non-exact, 64%)	1	AF043900								
	brain my047 protein	1	AF063605	1	+	+			+		
35	branched chain keto acid dehydrogenase E1, alpha polypeptide (maple syrup urine disease) (BCKDHA)	3	Z14093	1	+	+			+		
	BRCA1 associated protein- 1 (ubiquitin carboxy- terminal hydrolase) (BAP1)	1	D87462	+	+	+	+				
40	BRCA1, Rho7 and vati genes, and lpf35	1	L78833								
	breakpoint cluster region protein, uterine leiomyoma, 1; barrier to autointegration factor (BCRP1)	2	AF044773		+	+					
	breakpoint cluster region protein, uterine leiomyoma, 2 (BCRP2)	2	AF044774		+	+			+	+	
45	breast cancer anti-estrogen resistance 3 (BCAR3) (non-exact 73%)	1	U92715								
	bromodomain-containing protein, 140kD (peregrin) (BR140)	2	M91585		+						
50	Bruton's agammaglobulinemia tyrosine kinase (Btk)	1	U13424								

5	Bruton's tyrosine kinase (BTK)	1	U78027									
	Bruton's tyrosine kinase (BTK), alpha-D-galactosidase A (GLA), L44-like ribosomal protein (L44L) and FTP3 (FTP3)	1	U78027									
	BS4	1	AF108083									
10	BTG2 (BTG2)	6	Y09943	+	+	+	+		+			
	BTK region clone ffp	1	U78027	+	+	+	+		+			
	BTK region clone ffp-3	1	U01923		+	+			+			
	BUB3 (budding uninhibited by benzimidazoles 3, yeast) homolog (BUB3)	4	AF053304	+	+	+	+		+			
15	butyrate response factor 1 (EGF-response factor 1) (BRF1)	4	X79067	+	+	+	+		+			
	butyrophilin (BTF1)	7	U90543		+	+			+			
	butyrophilin like receptor	1	AB020625.1									
	CAG repeat containing (CTG4A)	2	U80744		+	+						
	CAGH32	2	U80743		+	+			+			
20	calcium channel, voltage-dependent, L type, alpha 1D subunit (CACNA1D) (low match)	1	M83586									
	calcium/calmodulin-dependent protein kinase (CaM kinase) II gamma (CAMK2G)	1	AF069765		+	+	+		+			
25	calcium/calmodulin-dependent protein kinase kinase (KIAA0787)	1	AF101264	B	+	+			+			
	calmodulin (=M19311)	7	D45887									
	calmodulin 1 (phosphorylase kinase, delta) (CALM1)	6	M27319	B	+	+			+	+		
	calnexin (CANX)	3	M94859	I	+				+	+		
30	calpain, large polypeptide L1 (CAPN1)	5	X04366		+	+			+	+		
	calpain, large polypeptide L2 (CAPN2)	5	M23254		+	+						
	calpain, small polypeptide (CAPN4)	1	X04106		+	+			+	+		
	calpastatin (CAST)	3	D16217						+			
35	Calponin 2	2	D83735		+				+	+		
	calponin 2 (CNN2)	1	D83735	B, I	+				+			
	calponin 2 (CNN2) (low score)	1	D83735									
	calumenin (CALU)	3	AF013759	B		+			+	+		
40	cAMP response element-binding protein CRE-Bpa (H_GS16SL15.1)	4	L05912									
	cAMP-dependent protein kinase type II (Ht31)	1	M90360									
	canicular multispecific organic anion transporter (CMOAT2)	1	AF009670						+	+	+	
45	capping protein (actin filament) muscle Z-line, alpha 1 (CAPZA1)	6	U56637	B, I		+					+	
	capping protein (actin filament) muscle Z-line, alpha 2 (CAPZA2)	2	U03269	B	+	+						
	capping protein (actin filament) muscle Z-line, beta (CAPZB)	1	U03271	+	+	+	+		+			

5	capping protein (actin filament), gelsolin-like (CAPG)	8	M94345	+	+	+	+	+	+	
	carbamoyl-phosphate synthetase 2, aspartate transcarbamylase, and dihydroorotase (CAD)	1	D78586	+	+	+	+	+	+	
	carbonic anhydrase V, mitochondrial (CA5)	1	L19297		+			+		
10	carboxypeptidase D (CPD)	3	U65090	B	+	+				
	camitine/acylcarnitine translocase (CACT)	1	Y10319		+	+		+		
	Cas-BF-M (murine) ecotropic retroviral transforming sequence (cbl)	2	X57110					+		
15	casein kinase 1, alpha 1 (CSNK1A1)	1	L37042	+	+	+	+		+	
	casein kinase 2, alpha 1 polypeptide (CSNK2A1)	2	M55265	B	+				+	+
	casein kinase I gamma 3L (CSNK1G3L)	1	AF049090.1							
	casein kinase II alpha subunit (=S72393)	1	X68951							
20	CASP8 and FADD-like apoptosis regulator (CFLAR)	4	AF015450		+	+	+	+	+	
	caspase 1, apoptosis-related cysteine protease (interleukin 1, beta, convertase) (CASP1)	7	U13697	+				+		
25	caspase 10, apoptosis-related cysteine protease (CASP10)	1	U60519		B, T activated, T lymphoma				+	
	caspase 3, apoptosis-related cysteine protease (CASP3)	3	U13737		B, T	+	+	+	+	
	caspase 4, apoptosis-related cysteine protease (CASP4)	6	U25804	+	+	+	+		+	
30	caspase 5, apoptosis-related cysteine protease (CASP5)	1	U28015			+				
	caspase 8, apoptosis-related cysteine protease (CASP8)	2	X98173		+			+		+
	caspase 9, apoptosis-related cysteine protease (CASP9)	1	U56390	B				+	+	
35	catalase (CAT)	5	X04076	B	+	+			+	
	catechol-O-methyltransferase (COMT)	1	M65213		+	+		+		
	catenin (cadherin-associated protein), alpha 1 (102kD) (CTNNA1)	6	D14705		+	+				
40	cathelicidin antimicrobial peptide (CAMP)	1	X89658	B						
	cathepsin B (CTSB)	4	L16510			+			+	+
	cathepsin C (CTSC)	3	U79415		+	+	+		+	
	cathepsin D (lysosomal aspartyl protease) (CTSD)	4	M11233		+	+			+	
	cathepsin E (CTSE)	1	J05036						+	
45	cathepsin G (CTSG)	1	M16117		I, W		+			
	cathepsin S (CTSS)	34	M86553		B, Monocyte stimulated, T lymphoma				+	+
	cathepsin W (lymphopain) (CTSW)	4	AF013811							+
	CBF1 interacting corepressor CIR (=U03644 recepin)	1	AF098297							

5	CCAAT/enhancer binding protein (C/EBP), alpha (CEBPA)	3	X87248		+	+	+	+	+	
	CCAAT/enhancer binding protein (C/EBP), delta (CEBPB)	1	S63168			+		+	+	
	CCAAT-box-binding transcription factor (CBF2)	2	M37197	T lymphoma			+	+		
10	CCR5 receptor (CCR5) (non-exact?)	1	AF011504							
	CD14 antigen (CD14)	11	M86511	+	+	+	+		+	
	CD18 (=M95293)	4	X64071							
	CD1C antigen, c polypeptide (CD1C)	2	M28827						+	
	CD2 antigen (cytoplasmic tail)-binding protein 2 (CD2BP2)	1	AF104222							
15	CD2 antigen (p50), sheep red blood cell receptor (CD2)	4	M14362	+		+	+		+	
	CD2 cytoplasmic tail-binding protein 1 (CD2BP1)	2	AF038602					+		
	CD20 antigen (CD20)	1	X12530							
20	CD20 receptor (S7)	1	X07203							
	CD22 antigen (CD22)	1	U82631	B						
	CD24 signal transducer	1	M58664							
	CD33 antigen (gp67) (CD33)	1	M23197					+		
	CD33 antigen-like 2: OB binding protein-2 (CD33L2) (non-exact, 88%)	1	U71383							
25	CD33L2 (51% aa)	1	D86359							
	CD36 antigen (collagen type I receptor, thrombospondin receptor) (CD36)	7	M98398	T lymphoma		+		+	+	
	CD37 antigen (CD37)	5	X14046	+	+		+		+	
30	CD38 alt	1	D84277							
	CD39 antigen (CD39)	1	U87967	B	+			+	+	
	CD3D antigen, delta polypeptide (TIT3 complex) (CD3D)	1	X03934			+	+		+	
	CD3E antigen, epsilon polypeptide (TIT3 complex) (CD3E)	1	X03884	+			+			
35	CD3G antigen, gamma polypeptide (TIT3 complex) (CD3G)	2	X06026	W				+		
	CD3Z antigen, zeta polypeptide (TIT3 complex) (CD3Z)	2	J04132	+			+			
	CD3-zeta (clone pBS NK1)	1	X55510							
40	CD4 (low match)	1	S68043							
	CD4 antigen (p55) (CD4)	4	M12807		+	+		+		
	CD44 antigen (homing function and Indian blood group system) (CD44)	6	X56794	W				+	+	
	CD48 antigen (B-cell membrane protein) (CD48)	3	X06341	+	+	+	+		+	
45	CD53 antigen (CD53)	10	L11670	+	+		+		+	
	CD53 antigen (CD53) (low match)	1	M60871							
	CD63 antigen (melanoma 1 antigen) (CD63)	3	M59907							
	CD88 antigen (CD88)	2	S57235		+	+		+	+	

5	CD74 antigen (invariant polypeptide of major histocompatibility complex, class II antigen-associated) (CD74)	72	K01144	+	+	+	+	+	+	high in many libraries
	CD78A antigen (immunoglobulin-associated alpha) (CD78A)	2	M80462			+				
10	CD79B antigen (immunoglobulin-associated beta) (CD79B)	2	M89957	+						
	CD8 antigen, alpha polypeptide (p32) (CD8A)	2	M27161	+			+		+	
	CD8 antigen, beta polypeptide 1 (p37) (CD8B1)	1	X13445	W						
15	CD81 antigen (target of antiproliferative antibody 1) (CD81)	1	M33680		+	+			+	
	CD83 antigen (activated B lymphocytes, immunoglobulin superfamily) (CD83)	1	Q01151	B	+	+			+	
	CD84 antigen (leukocyte antigen) (CD84)	1	U82988		+	+			+	
20	CD86 antigen	1	L25259		+					
	CD9 antigen (p24) (CD9)	2	M38690			+		+	+	
	CD97 antigen (CD97)	12	X84700	+	+		+			
	CD97 antigen (CD97) (non-exact 59%)	1	P48960							
	CD97 antigen (CD97) (non-exact 62%)	1	X94630	+	+		+			
25	CDC23 (cell division cycle 23, yeast, homolog) (CDC23)	1	AF053977		+			+	+	
	CDC37 homolog	1	U63131	B	+	+		+	+	
	Cdc42 effector protein 3 (CEP3)	2	AF104857	B	+	+		+		
	CDC-like kinase (CLK)	1	L29219		+	+	+		+	
30	CDC-like kinase 2 (CLK2)	1	AF023268	B	+	+				
	CDW52 antigen (CAMPATH-1 antigen) (CDW52)	13	X15183	T activated	+	+		+		
	cell cycle progression restoration 8 protein(CPR8)	1	AF011794							
35	cell division cycle 10 (homologous to CDC10 of S. cerevisiae) (CDC10)	4	S72008	+	+	+	+		+	
	cell division cycle 20, S.cerevisiae homolog (CDC20)	1	U05340		+	+	+			
	cell division cycle 25B (CDC25B)	6	Z68092	+	+	+	+		+	
40	cell division cycle 2-like 1 (PITSLRE proteins) (CDC2L1) (non-exact 42%)	1	AF067514							
	cell division cycle 42 (GTP-binding protein, 25kD) (CDC42)	5	M35543	+	+	+	+		+	
	cell division protein (non-exact 68%)	1	AF083015							
45	CELL-CYCLE NUCLEAR AUTOANTIGEN SG2NA (S/G2 NUCLEAR ANTIGEN)	1	Q13033							
	centromere protein B (80kD) (CENPB)	1	X55039		+			+		
	cep250 centrosome associated protein	3	AF022655	B	+			+		

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ceroid-lipofuscinosis, neuronal 2, late infantile (Jansky-Bielschowsky disease) (CLN2)	7	AF017456	+	+	+	+	+	+	+	high in bone
c-fgr (=M63877 nonreceptor protein-tyrosine kinase (fgr))	6	X52206								
CGI-19 protein	3	AF132853.1								
chaperonin containing TCP1, subunit 3 (gamma) (CCT3)	1	X74801		+	+				+	
chaperonin containing TCP1, subunit 4 (delta) (CCT4)	1	AF026291		+	+			+	+	
chaperonin containing TCP1, subunit 6A (zeta 1) (CCT6A)	4	L27706	B	+	+					
chaperonin containing TCP1, subunit 7 (eta) (CCT7)	4	AF026292	B	+					+	
Chediak-Higashi syndrome 1 (CHS1)	1	U87615	B, T lymphoma	+	+			+		
Chediak-Higashi syndrome 1 (CHS1) (low score)	1	U87615								
chemokine (C-C motif) receptor 2 (CCR2)	4	U03805								
chemokine (C-C motif) receptor 4 (CCR4) (low match) (may contain repeat)	1	X85740								
chemokine (C-C motif) receptor 7 (CCR7)	6	L31581								
chemokine (C-X3-C) receptor 1 (CX3CR1)	5	U20350		+						
chemokine (C-X-C motif), receptor 4 (fusin) (CXCR4)	5	M99293	+	+	+	+	+	+	+	
chitinase 3-like 1 (cartilage glycoprotein-39) (CHI3L1)	2	M80927		+		+			+	
chitinase 3-like 2 (CHI3L2)	2	U49835		+		+			+	
chloride channel 1, skeletal muscle (CLCN1)	1	G18280								
chloride channel 6 (CLCN6)	1	D28475		+	+					
chloride intracellular channel 1 (CLIC1)	1	U93205	+	+	+	+			+	
chondroitin sulfate proteoglycan 2 (versican) (CSPG2)	5	X15998			+					
chondroitin sulfate proteoglycan core protein	2	J02814			+				+	
chromatin assembly factor 1 p48 subunit (CAF-1 P48 subunit) (retinoblastoma binding protein p48) (retinoblastoma-binding protein 4) (MSI1 protein homolog)	1	Q09028								
chromodomain helicase DNA binding protein 1 (CHD1)	2	AF008513								
chromodomain helicase DNA binding protein 1-like (CHD1L)	1	AF054177								
chromodomain helicase DNA binding protein 2 (CHD2)	1	AF006514	B	+	+			+		
chromodomain helicase DNA binding protein 3 (CHD3)	1	AF006515								
chromodomain helicase DNA binding protein 4 (CHD4)	5	X86691	+	+	+	+			+	

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5	coatmer protein complex, subunit alpha (COPA)	5	U24105	T	+				+		
	Cofilin 1 (non-muscle) (CFL1)	13	X95404	+	+	+	+	+	+	+	high in fetal brain
	cold inducible RNA-binding protein (CIRBP)	7	D78134		+	+				+	
	cold shock domain protein A (CSDA)	3	X95325		+	+					
10	collagen, type IX, alpha 2 (COL9A2)	3	AF019408	B							
	colony stimulating factor 1 receptor, formerly McDonough feline sarcoma viral (v-fms) oncogene homolog (CSF1R)	3	X03663		+				+	+	
15	colony stimulating factor 2 receptor, beta, low-affinity (granulocyte-macrophage) (CSF2RB)	5	M59941								
	colony stimulating factor 2 receptor, beta, low-affinity (granulocyte-macrophage) (CSF2RB) (low match)	1	M59941								
20	colony stimulating factor 3 receptor (granulocyte) (CSF3R)	16	X55720		+						
	complement component 5 receptor 1 (C5a ligand) (CSR1)	1	M62505	L							
	conserved gene amplified in osteosarcoma (OS4)	2	AF000152		+	+	+			+	
25	COP9 (constitutive photomorphogenic, Arabidopsis, homolog) subunit 3 (COPS3)	2	AF031647		+	+				+	
	COP9 homolog (HCOP9)	2	U51205	B	+	+	+	+	+	+	
	COP11 protein, homolog of s. cerevisiae SEC23p (SEC23A)	4	X97064		+	+					
30	copine 1 (CPNE1)	2	U83246	B	+	+			+		
	copine 1 (CPNE1) (low score)	1	U83246								
	coproporphyrinogen oxidase (coproporphyrin, harderoporphyrin) (CPO)	1	D16611			+			+	+	
	core-binding factor, beta subunit (CBFB)	1	L20298		+						
35	coronin	22	X89109	T, W	+	+			+		
	coronin (low match)	1	U34690								
	coronin (non-exact, 71%)	1	X89109								
	cot (cancer Osaka thyroid) oncogene (COT)	1	D14497	+	+	+	+			+	
	cryptochrome 1 (photolyase-like) (CRY1)	1	D84657		+	+				+	
40	CTD (carboxy-terminal domain, RNA polymerase II, polypeptide A) phosphatase, subunit 1 (CTDP1)	1	AF081287		+	+	+			+	
	C-terminal binding protein 1 (CTBP1)	1	U37408	B	+	+			+		
	C-terminal binding protein 2 (CTBP2)	2	AF016507		+	+			+		
45	CUG triplet repeat, RNA-binding protein 1 (CUGBP1)	3	U63289		+	+	+			+	
	cullin 1 (CUL1)	3	U58087		+	+	+			+	
	cullin 3 (CUL3)	2	U58089		+	+	+			+	
50	cut (Drosophila)-like 1 (CCAAT displacement protein) (CUTL1)	1	M74099	B	+						

5	cydin D2 (CCND2)	2	D13639		+	+	+		+	
	cydin D3 (CCND3)	5	M92287	B, T lymphoma		+			+	
	cydin G1 (CRNG1)	1	D78341	B	+	+			+	
	cydin I	3	D50310	B	+				+	
	cydin T2 (CNNT2)	1	AF048732	B, T lymphoma	B					
10	cydin-dependent kinase 2 (CDK2)	1	X62071							
	cydin-dependent kinase inhibitor (p27Kip1)	1	S76986							
	cydin-dependent kinase inhibitor 1A (p21, Cip1) (CDKN1A)	2	S67388	+	+	+	+	+	+	
	CYP2D7-CYP2D6 intergenic region (partial)	1	X90928							
15	cystatin B (steifin B) (CSTB)	1	L03558			+			+	+
	cysteine and glycine-rich protein 3 (cardiac LIM protein) (CSRFP3)	5	L54057			+				
	cytidine deaminase (CDA)	2	L27943						+	
	cytochrome b	1	AF042500							
20	cytochrome b (CYTB) (isolate Aus5)	1	AF042518							
	cytochrome b(-245) beta chain N-terminal region (X-linked granulomatous disease gene)	2	X05895							
	cytochrome b-245, beta polypeptide (chronic granulomatous disease) (CYBB)	2	X04011	+				+		+
25	cytochrome C	1	P00001							
	cytochrome c oxidase subunit IV (COX4)	1	U90915	I	+	+			+	+
	cytochrome c oxidase subunit Vb (COX5B)	2	M59250						+	
30	cytochrome c oxidase subunit VI-related protein (COX7RP)	6	AB007618	+	+	+	+			+
	cytokine suppressive anti-inflammatory drug binding protein 1 (p38 MAP kinase) (CSBP1)	1	L35263	lymphocyte	+	+			+	
	Cytoplasmic antiproteinase-38 kda intracellular serine proteinase inhibitor	1	S69272			+				
35	cytotoxic granule-associated RNA-binding protein p40-TIA-1	1	S70114							
	D123 (D123)	1	D14878	+	+			+		+
	D2-2	1	AF019226							
40	D38	1	X74802							
	damage-specific DNA binding protein 1 (127kD) (DDB1)	2	AJ002855	+	+	+	+	+	+	
	DCHT (low match)	1	AF017635							
	DEAD/H (Asp-Glu-Ala-Asp/His) box binding protein 1 (DDXBP1)	1	U78524		+	+	+	+	+	
45	DEAD/H (Asp-Glu-Ala-Asp/His) box polypeptide (72KD) (P72)	2	U59321	I	+	+			+	+
	DEAD/H (Asp-Glu-Ala-Asp/His) box polypeptide 1 (DDX1)	1	X70649		+	+			+	

5	DEAD/H (Asp-Glu-Ala-Asp/His) box polypeptide 15 (DDX15)	2	AB001636							
	DEAD/H (Asp-Glu-Ala-Asp/His) box polypeptide 16 (DDX16)	2	AB011149	+	+	+	+	+		
	DEAD/H (Asp-Glu-Ala-Asp/His) box polypeptide 3 (DDX3)	3	U50553	+	+	+	+	+		
10	DEAD/H (Asp-Glu-Ala-Asp/His) box polypeptide 5 (RNA helicase, 68kD) (DDX5)	37	X15729	+	+	+	+	+		
	DEAD/H (Asp-Glu-Ala-Asp/His) box polypeptide 5 (RNA helicase, 68kD) (DDX5) (low match)	1	AF015812							
15	DEAD/H (Asp-Glu-Ala-Asp/His) box polypeptide 6 (RNA helicase, 54kD) (DDX6)	2	D17532	+	+					
	DEAD/H (Asp-Glu-Ala-Asp/His) box polypeptide 8 (RNA helicase, 54kD) (DDX8)	1	D50487		+	+	+	+		
20	DEAD/H (Asp-Glu-Ala-Asp/His) box polypeptide 9 (RNA helicase A, nuclear DNA helicase II; leukophysin) (DDX9)	3	L13848	+	+	+	+	+		
	DEAD/H (Asp-Glu-Ala-Asp/His) box polypeptide, Y chromosome (DBY)	1	AF000985		+	+		+		
25	Death associated protein 3 (DAP3)	2	X83544	+	+	+	+	+	+	
	death effector domain-containing protein (DEDD)	1	AF083236		+	+	+		+	
	death-associated protein 6 (DAXX)	2	AF039136		+	+	+		+	
	dedicator of cyto-kinesis 2 (DOCK2)	4	D86964	+	+		+		+	
30	defender against cell death 1 (DAD1)	1	D15057			+			+	+
	Defensin, alpha 1, myeloid-related sequence (DEFA1)	4	L12690					+	+	+
	DEK gene (D6S231E)	1	X64229	B			+		+	
	delta sleep inducing peptide, immunoreactor (DSIP)	4	Z50781	+	+	+	+		+	
35	dendritic cell protein (GA17)	3	AF064603	+	+	+	+		+	
	deoxycytidine kinase (DCK)	1	M60527							
	deoxynucleonuclease II, lysosomal (DNASE2)	3	AB004574							
	DGS-1	2	L77588		+					
40	diacylglycerol kinase	3	D16440							
	diacylglycerol kinase alpha (DAGK1) (clone 24)	3	AF064771		+					
	diacylglycerol kinase alpha (DAGK1) (clone 24) (low match)	1	AF064771							
	diaphanous (Drosophila, homolog) 1 (DIAPH1)	1	AF051782	B. monocyte stimulated	+	+		+	+	
45	diaphorase (NADH) (cytochrome b-5 reductase) (DIA1)	1	Y09501	+	+	+	+	+	+	
	differentiated Embryo Chondrocyte expressed gene 1 (DEC1)	1	AB004066		+			+	+	

5	differentiated Embryo Chondrocyte expressed gene 1 (DEC1) (low match)	1	AB004068									
	differentiation antigen CD20	1	L23415									
	DiGeorge syndrome critical region gene 2 (DGCR2)	1	X84078		+	+				+		
10	dihydrolipoamide dehydrogenase (E3 component of pyruvate dehydrogenase complex, 2-oxo-glutarate complex, branched chain keto acid dehydrogenase complex) (DLD)	2	J03820		+					+	+	
15	dihydrolipoamide S-acetyltransferase (E2 component of pyruvate dehydrogenase complex) (DLAT)	1	Y00978	B	+					+		
	dihydropyrimidinase-like 2 (DPYSL2)	1	D78013		+	+				+	+	
	dinG gene	1	Y10571									
20	diphtheria toxin resistance protein required for diphthamide biosynthesis (Saccharomyces)-like 2 (DPH2L2)	3	AF053003	B	+	+				+	+	
	disintegrin-protease (non-exact 72%)	1	Y13323									
	DJ-1 protein	2	AF021819		+	+	+	+			+	
	Dmx-like 1 (DMXL1)	1	AJ005821		+		+	+				
25	DNA (cytosine-5)-methyltransferase 1 (DNMT1)	3	X63692	T activated, lymphoma	+					+	+	
	DNA fragmentation factor, 40 kD, beta subunit (DFFB)	1	AF064019									
	DNA fragmentation factor, 45 kD, alpha subunit (DFFA)	2	U91985	T	+	+					+	
30	DNA mismatch repair protein (hMLH1)	1	U17840									
	DNA segment on chromosome X (unique) 648 expressed sequence	3	M64241	+	+	+	+	+	+	+	+	high in many libraries
	DNA segment, single copy probe LNS-CAI/LNS-CAII (deleted in polyposis) (D5S348)	3	M73547		+	+	+	+		+		
35	DNA-damage-inducible transcript 1 (DDIT1) (low match)	1	L24498									
	DnaJ protein	1	AJ001309									
	DnaJ protein	1	AJ001309									
	docking protein 2, 56kD (DOK2)	1	AF034970									
40	dolichyl-diphosphooligosaccharide-protein glycosyltransferase (DDOST)	1	D89060	+	+	+	+	+	+	+	+	activated T cell
	dolichyl-phosphate mannosyltransferase polypeptide 1, catalytic subunit (DPM1)	1	D86198	T activated	+	+				+		
45	down-regulated by activation (immunoglobulin superfamily) (DORA)	1	AJ223183							+		
	down-regulated in adenoma DRA (low match)	1	P40879									
	D-type cyclin-interacting protein 1 (DIP1)	1	AF082569	B						+	+	

5	dual specificity phosphatase 1 (DUSP1)	4	X68277	+	+	+	+	+	+	+	+
	dual specificity phosphatase 11 (RNA/RNP complex 1-interacting) (dusp11)	1	AF023917	+	+	+	+	+	+	+	+
10	dual specificity phosphatase 3 (vaccinia virus phosphatase VH1-related) (DUSP3)	1	L05147		+	+		+	+		
	dual specificity phosphatase 6 (DUSP6)	6	X93920	+	+	+	+	+	+		
	dynactin 1 (p150, Glued (Drosophila) homolog) (DYTN1)	3	X98801								
15	dynactin 1 (p150, Glued (Drosophila) homolog) (DYTN1) (low match)	1	X98801	B	+	+					
	dynamitin 2 (DNM2)	1	L36983								
	dynamitin (dynactin complex 50 kD subunit) (DCTN-50) (non-exact 88%)	1	U50733								
20	dynein, axonemal, heavy polypeptide 17-like (non-exact, 57%aa)	1	X99947								
	dynein, cytoplasmic, light intermediate polypeptide 2 (DNCL12)	1	AF035812	B	+	+				+	
	dynein, cytoplasmic, light intermediate polypeptide 2 (DNCL12) (non-exact, 69%)	1	AF035812								
25	dyskeratosis congenita 1, dyskerin (DKC1)	1	U59151	B	+				+	+	
	dystonia 1, torsion (autosomal dominant) (DYT1)	1	AF007871		+	+	+			+	
	dystrobrevin, beta (DTNB)	1	AF022728		+						
	dystrophia myotonica-containing WD repeat motif (DMWD)	1	L19267		+	+			+	+	
30	dystrophia myotonica-protein kinase (DMPK)	1	L08835	+	+	+				+	
	dystrophin (muscular dystrophy, Duchenne and Becker types) (DMD) (low match, 59%aa)	1	X14298								
35	E1B-55kDa-associated protein	1	AJ007509	W	+	+			+	+	
	E2F transcription factor 3 (E2F3)	2	D38550		+	+	+	+	+	+	
	E2F transcription factor 4, p107/p130-binding (E2F4)	1	X86096	B	+				+		
	E2F transcription factor 5, p130-binding (E2F5)	2	U15642	+	+		+		+		
40	E74-like factor 1 (ets domain transcription factor) (ELF1)	1	M82882	B		+			+	+	
	E74-like factor 4 (ets domain transcription factor) (ELF4)	3	U32645		+	+				+	
	E74-like factor 4 (ets domain transcription factor) (ELF4) (non-exact, 71%)	1	U32645								
45	early development regulator 2 (homolog of polyhomeotic 2) (EDR2)	4	U89278	+	+	+	+			+	
	EBV induced G-protein coupled receptor (EBI2)	1	L08177	W							
	ecotropic viral integration site 2B (EVI2B)	3	M60830		+		+				

5	ectin, galactoside-binding, soluble, 1 (galectin 1) (LGALS1)	1	J04458							+	
	EGF-like-domain, multiple 4 (EGFL4)	1	AB011541								
	eIF-2-associated p67 homolog	3	U13281	B	+					+	
10	elastin (supravalvular aortic stenosis, Williams-Beuren syndrome) (ELN) (low match)	1	M24782		+	+					
	elav-type RNA-binding protein (ETR-3)	3	U69548								
	electron-transfer-flavoprotein, alpha polypeptide (glutamic aciduria II) (ETFA)	2	J04058		+						
15	ELK3, ETS-domain protein (SRF accessory protein 2) (ELK3)	2	Z38715			+				+	
	elongation factor 1-beta	1	L28404								
	elongation factor 1s (mitochondrial protein)	1	AF110399								
20	elongation factor 1u-nuclear encoded mitochondrial	1	X84894								
	eMDC II protein	1	AJ242015.1								
	ems1 sequence (mammary tumor and squamous cell carcinoma-associated (p80/85 src substrate) (EMS1)	1	M98343			+	+		+	+	
25	endogenous retroviral element HC2	1	Z70664								
	endosulfine alpha (ENSA)	1	X99906	1	+						
	endothelial differentiation, sphingolipid G-protein-coupled receptor, 1 (EDG1)	2	M31210			+	+	+		+	
30	endothelial differentiation, sphingolipid G-protein-coupled receptor, 1 (EDG1) (low match 66%)	1	M31210								
	endothelial monocyte-activating polypeptide (EMAPII)	1	U10117	+		+	+	+	+	+	
	enolase 1, (alpha) (ENO1)	12	M14328	+		+	+	+	+	+	
35	enolase 2, (gamma, neuronal) (ENO2)	1	X51956			+					
	enolase-alpha	1	D28437								
	enoyl Coenzyme A hydratase 1, peroxisomal (ECH1)	2	U16660								
	enoyl Coenzyme A hydratase, short chain, 1, mitochondrial (ECHS1)	1	D13900	+		+	+	+	+	+	
40	ENOYL-COA HYDRATASE, MITOCHONDRIAL PRECURSOR (SHORT CHAIN ENOYL-COA HYDRATASE) (SCEH) (ENOYL-COA HYDRATASE 1) (low match, non-exact 56%)	1	P30084								
45	epidermal growth factor receptor pathway substrate 15 (EPS15)	2	U07707			+		+		+	

5	EPIDIDYMAL SECRETORY PROTEIN E1 PRECURSOR (EPI-1) (HE1) (EPIDIDYMAL SECRETORY PROTEIN 14.6) (ESP14.6)	2	Q15668								
	epithelial membrane protein 3 (EM/P3)	1	U87947	+	+	+	+		+		
10	Epoxide hydrolase 1, microsomal (xenobiotic) (EPHX1)	1	U29768							+	only
	ERCC2 (EL47234)	1	X52221								
	ERF-2	3	U07802	+		+	+	+		+	high in gall bladder
	Erp28 protein	1	X94910	+		+	+	+		+	
	erythrocyte membrane protein	2	M81635								
15	erythroleukemic cells K562	2	U25343								
	EST (Hs.189509)	2	U24166								
	estrogen receptor-related protein (hERRa1)	1	L38487								
	ESTs, Highly similar to ADENYLOSUCCINATE SYNTHETASE	1	X66503	B, T		+	+				
20	ESTs, Moderately similar to cysteine-rich fibroblast growth factor receptor	1	U28811	+		+	+	+		+	
	ET binding factor 1 (SBF1)	1	U93181	+		+				+	
	ets domain protein ERF	1	U15655	+		+	+	+		+	
	eukaryotic translation elongation factor 1 alpha 1 (EEF1A1)	326	X03558	T		+	+			+	
25	eukaryotic translation elongation factor 1 alpha 1 (EEF1A1) (low match)	1	X03558								
	eukaryotic translation elongation factor 1 alpha 1 (EEF1A1) (low match)	1	X03558								
30	eukaryotic translation elongation factor 1 beta 2 (EEF1B2)	5	X60489	+		+	+	+		+	
	eukaryotic translation elongation factor 1 delta (guanine nucleotide exchange protein) (EEF1D)	1	Z21507	+		+	+	+	+	+	
	eukaryotic translation elongation factor 1 gamma (EEF1G)	31	Z11531								
35	eukaryotic translation elongation factor 2 (EEF2)	2	X51466			+				+	
	eukaryotic translation initiation factor 2, subunit 1 (alpha, 35kD) (EIF2S1)	1	J02645								
	eukaryotic translation initiation factor 2, subunit 2 (beta, 38kD) (EIF2S2)	1	M29536								
40	eukaryotic translation initiation factor 2, subunit 3 (gamma, 52kD) (EIF2S3)	3	L19161			+	+				
	eukaryotic translation initiation factor 3, subunit 10 (theta, 150/170kD) (EIF3S10)	2	U78311								
45	eukaryotic translation initiation factor 3, subunit 2 (beta, 36kD) (EIF3S2)	3	U36764	+		+	+	+	+	+	high in white blood cells
	eukaryotic translation initiation factor 3, subunit 3 (gamma, 40kD) (EIF3S3)	6	U54559	+		+	+	+		+	high in spleen
	eukaryotic translation initiation factor 3, subunit 4 (delta, 44kD) (EIF3S4)	9	AF020833			+	+	+		+	

5	eukaryotic translation initiation factor 3, subunit 6 (48kD) (EIF3S6)	4	U94175	+	+	+	+	+	+	high in bladder
	eukaryotic translation initiation factor 3, subunit 6 (EIF3S6)	1	U62862		+	+	+		+	Highly represented (1.4833 pct) in library 36 human gall bladder
10	eukaryotic translation initiation factor 3, subunit 7 (zeta, 66/67kD) (EIF3S7)	3	U54558	+	+	+	+		+	
	eukaryotic translation initiation factor 3, subunit 8, 110kD (EIF3S8)	5	U46025	+	+	+	+	+	+	high in testis
	eukaryotic translation initiation factor 4 gamma, 1 (EIF4G)	1	AF012088							
15	eukaryotic translation initiation factor 4 gamma, 1 (EIF4G) (low match)	1	AF012088							
	eukaryotic translation initiation factor 4 gamma, 1 (EIF4G1)	2	D12686							
	eukaryotic translation initiation factor 4 gamma, 2 (EIF4G2)	6	U73824	+	+	+	+	+	+	
20	eukaryotic translation initiation factor 4 gamma, 2 (EIFG2)	2	U76111	+	+	+	+	+	+	
	eukaryotic translation initiation factor 4A, isoform 1 (EIF4A1)	29	D13748							
	eukaryotic translation initiation factor 4A, isoform 2 (EIF4A2)	11	D30655	+	+	+	+	+	+	
25	eukaryotic translation initiation factor 4B (EIF4B)	18	X55733	+	+	+	+		+	
	eukaryotic translation initiation factor 4E (EIF4E)	1	P06730							
	Eukaryotic translation initiation factor 4E binding protein 2 (EIF4EBP2)	3	L36056	1, B	+				+	
30	eukaryotic translation initiation factor 4H (EIF4H)	2	Q15056							
	eukaryotic translation initiation factor 5 (EIF5)	2	U49436	+	+	+	+	+	+	
	eukaryotic translation termination factor 1 (ETF1)	2	U90176	+	+	+	+		+	
	EV12 protein	1	M55266		+					
35	Ewing sarcoma breakpoint region 1 (EWSR1)	1	X66899	+	+	+	+		+	
	EWS/FLI1 activated transcript 2 homolog (EAT-2)	2	AF020264							
	EWS-E1A-F chimERIC protein	1	U35622							
40	excision repair cross-complementing rodent repair deficiency, complementation group 1 (includes overlapping antisense sequence) (ERCC1)	1	M28650	+	+	+	+		+	
45	excision repair cross-complementing rodent repair deficiency, complementation group 5 (xeroderma pigmentosum, complementation group G (Cockayne syndrome)) (ERCC5)	1	X69978		+	+	+		+	
	exostoses (multiple)-like 3 (EXTL3)	1	AF001690		+	+	+		+	
50	F11	1	X77744				+			

5	fibroblast growth factor receptor 2 (bacteria-expressed kinase, keratinocyte growth factor receptor, craniofacial dysostosis 1, Crouzon syndrome) syndrome, Pfeiffer syndrome, Jackson-Weiss) (FGFR2)	1	M35718	+	+	+	+	+	+	
10	ficollin (collagen/fibrinogen domain-containing) 1 (FCN1)	19	D83920				+		+	
	filamin A, alpha (actin-binding protein-280) (FLNA)	2	X53418							
15	filamin B, beta (actin-binding protein-278) (FLNB)	1	AF043045		+	+		+		
	Finkel-Biskis-Reilly murine sarcoma virus (FBR-MuSV) ubiquitously expressed (fox derived); ribosomal protein S30 (FAU)	2	X65923	+	+	+	+	+	+	Highly represented in intraepithelial neoplasia and invasive prostate tumor
	FK-506 binding protein	1	M80199	+	+	+	+		+	
20	FK506-binding protein 1A (12kD) (FKBP1A)	2	M34539							
	FK506-binding protein 1B (12.6 kD) (FKBP1B)	1	M92423		+		+		+	
	FK506-binding protein 5 (FKBP5)	4	U71321		+	+	+		+	
	Flightless I (Drosophila) homolog (FLII)	3	U80184		+					
25	Flightless I (Drosophila) homolog (FLII) (low match)	1	U80184							
	FLN29 (FLN29)	2	AB007447		+		+		+	
	flotillin 2 (FLOT2)	5	M60922	+	+	+	+	+	+	
	folate receptor 2 (fetal) (FOLR2)	1	AF000380		+	+	+		+	
30	forkhead (Drosophila) homolog (rhabdomyosarcoma) like 1 (FKHRL1)	1	AF032886	+	+		+		+	
	formyl peptide receptor 1 (FPR1)	9	M60627	+	+	+	+		+	
	formyl peptide receptor-like 1 (FPRL1)	1	M84562							Found only in libraries from placenta
35	formyl peptide receptor-like 1 (FPRL1) (low score)	1	M84562							
	fragile X mental retardation 1 (FMR1)	1	L29074	+	+		+		+	
	fragile X mental retardation, autosomal homolog 1 (FXR1)	1	U25185	+	+	+	+			
40	Friend leukemia virus integration 1 (FLI1)	3	M93255	+	+					
	fructose-bisphosphatase 1 (FBP1)	1	D26054				+		+	
	FSHD-associated repeat DNA, proximal region	1	U85056							
	fucose-1-phosphate guanylyltransferase (FPGT)	1	AF017445		+	+	+			
45	full length insert cDNA clone ZA78A09	1	AF086122							
	full length insert cDNA YP07G10	1	AF075061							
	fumarate hydratase (FH)	1	U59309		+	+	+		+	
	FUS (low match)	1	X99006							
50	FYN-binding protein (FYB-120/130) (FYB)	18	U93049		+		+			

5	GLE1 (yeast homolog)-like, RNA export mediator (GLE1L)	1	AF058922		+	+						
	glia maturation factor, beta (GMFB)	1	AB001106	+	+		+		+			
	glioma-associated oncogene homolog (zinc finger protein) (GLI)	1	X07384									
10	glioma-associated oncogene homolog (zinc finger protein) (GLI) (low score)	1	X07384									
	globin, alpha 2	1	V00516									
	glucocorticoid receptor (=M69104)	1	M32284									
15	glucocorticoid receptor (GRL)	2	U80947	+	+	+	+		+			
	glucosylphosphatase isomerase (CONTAINS LARGE REPEAT)	1	L08105									
	glucosamine (N-acetyl)-6-sulfatase (Sanfilippo disease IIID) (GNS)	1	Z12173	+								
20	glucosamine (N-acetyl)-6-sulfatase (Sanfilippo disease IIID) (GNS) (non-exact 56%)	1	Z12173									
	glucose transporter-like protein-III (GLUT3)	1	M20681		+	+	+	+	+			
	glucose transporter-like protein-III (GLUT3) (low match)	1	M20681									
25	glucosidase, alpha; acid (Pompe disease, glycogen storage disease type II) (GAA)	1	Y00839	+	+		+		+			
	glucosidase, beta; acid (includes glucosylceramidase) (GBA)	1	K02920	+	+	+	+		+			
	glutamate dehydrogenase 1 (GLUD1)	1	M20867		+	+	+	+	+			
30	glutamate-ammonia ligase (glutamine synthase) (GLUL)	12	X59834	+	+	+	+		+			
	glutamate-ammonia ligase (glutamine synthase) (GLUL) (low score)	1	Y00387									
35	glutamate-cysteine ligase (gamma-glutamylcysteine synthetase), catalytic (72.8kD) (GLCLC)	1	M90656				+					
	glutamine cyclotransferase	1	X71125		+	+						
	glutamine-fructose-6-phosphate transaminase 1 (GFPT1)	1	M90516		+		+					
40	glutamyl-tRNA synthetase	1	X72396									
	glutamyl-tRNA synthetase (QARS)	6	X76013	+	+	+	+		+			
	glutamyl-prolyl-tRNA synthetase (EPRS)	1	X54326									
	glutathione peroxidase 1 (GPX1)	2	M21304	+	+	+	+	+	+			
45	glutathione peroxidase 4 (phospholipid hydroperoxidase) (GPX4)	1	X71973	+	+	+	+		+			
	glutathione S-transferase pi (GSTP1)	1	U30897		+	+	+	+	+			
	glutathione S-transferase subunit 13 homolog	1	AF070657									
50	glyceraldehyde-3-phosphate dehydrogenase (GAPD)	12	J02642						+			

5	glycogenin (GYG)	1	U31525		+	+	+		+	
	glycophorin C (Gerbich blood group) (GYPC)	1	X12496		+	+	+		+	
	glycoprotein M6B (GPM6B)	1	U45955		+	+				
	glycyl-tRNA synthetase (GARS)	1	U09587		+	+	+		+	
10	glyoxalase I (lactoyl glutathione lyase) (GLYI)	1	L07837	+	+	+	+		+	
	golgi autoantigen, golgin subfamily a, 1 (GOLGA1)	1	U51587		+		+			
	golgi autoantigen, golgin subfamily a, 2 (GOLGA2) (non-exact, 70%)	1	L08147							
	golgi autoantigen, golgin subfamily a, 4 (GOLGA4)	1	U31906							
15	golgi autoantigen, golgin subfamily b, macrogolgin (with transmembrane signal), 1 (GOLGB1)	1	X75304		+	+	+		+	
	gp25L2 protein	4	X90872							
	granulysin (GRN)	8	M81637		+	+	+			
	granulin (GRN)	16	X62320	+	+	+	+		+	
	granulin (GRN) (low match)	1	X62320							
20	Granulysin (NKG5)	5	M85276	+					+	
	granzyme A (granzyme 1, cytotoxic T-lymphocyte-associated serine esterase 3) (GZMA)	1	M18737	+	+	+	+		+	
	GRB2-related adaptor protein (GRAP)	1	U52518	I only						
25	Grb2-related adaptor protein 2 (GRAP2)	1	AF090456	I					+	
	GRO1 oncogene (melanoma growth stimulating activity, alpha) (GRO1)	1	X54489				+		+	
	growth arrest and DNA-damage-inducible gene (GADD153)	1	S40706							
30	growth arrest-specific 7 (GAS7)	4	AB007854		+	+				
	growth factor receptor-bound protein 2 (GRB2)	1	X62852	B	+				+	+
	GST1 (protein of unknown function)	1	M86934		+	+	+			
	GS3955	4	D87119		+	+	+		+	
35	GTP binding protein 1 (GTPBP1)	1	U87964		+	+	+			
	GTP binding protein similar to S. cerevisiae HBS1 (HBS1)	1	U87791		+	+	+		+	
	GTPase activating protein-like (GAPL)	1	AB011110		+	+	+		+	high fetal brain
40	GTP-binding protein (low match)	1	Z49068							
	GTP-binding protein G(K), alpha subunit (=G(I) ALPHA-3)(=GTP-binding regulatory protein Gi alpha-3 chain)	1	P08754							
	Gu protein (GURDB)	2	U41387	+		+	+		+	
45	guanine nucleotide binding protein	1								
	guanine nucleotide binding protein (G protein), alpha inhibiting activity polypeptide 2 (GNAI2)	4	J03004	+	+	+	+		+	

5	guanine nucleotide binding protein (G protein), alpha inhibiting activity polypeptide 3 (GNAI3)	7	M20597	+	+	+	+	+	+	
	guanine nucleotide binding protein (G protein), alpha stimulating activity polypeptide 1 (GNAS1)	2	X04409	B, I	+				+	+
10	guanine nucleotide binding protein (G protein), alpha transducing activity polypeptide 2 (GNAT2)	1	Z18859							
	guanine nucleotide binding protein (G protein), beta 5 (GNB5)	2	AF017656		+	+	+		+	
15	guanine nucleotide binding protein (G protein), beta polypeptide 1 (GNB1)	5	M36430	+	+	+	+	+	+	
	guanine nucleotide binding protein (G protein), q polypeptide (GNAQ)	2	AF011496		+	+	+			
	guanine nucleotide binding protein-like 1 (GNL1)	1	L25665	+	+	+	+		+	
	guanine nucleotide exchange factor	1	L13857	+	+	+	+			
20	guanine nucleotide regulatory factor (LFP40)	1	X15610	+	+	+	+		+	
	guanine nucleotide regulatory factor (LFP40)	1	U72206	+	+	+	+		+	
25	GUANINE NUCLEOTIDE-BINDING PROTEIN BETA SUBUNIT-LIKE PROTEIN 12.3 (P205) (RECEPTOR OF ACTIVATED PROTEIN KINASE C 1) (RACK1)	1	P25388							
	GUANINE-MONOPHOSPHATE SYNTHETASE (GMPS)	1	U10860			+				
	guanosine monophosphate reductase (GMPR) (non-exact, 72%)	1	M24470							
30	guanosine-diphosphatase like protein	1	AF016032							
	guanylate binding protein 1, interferon-inducible, 67kD (GBP1)	2	M55542		+	+	+	+	+	
	guanylate binding protein 2, interferon-inducible (GBP2)	6	M55543	+	+	+	+		+	
35	H2A histone family, member C (H2AFC)	1	Z83742							
	H2A histone family, member Y (H2AY)	2	AF041483	+	+	+	+		+	
	H2B histone family, member L (H2BFL)	2	Z80783	+	+	+	+	+	+	high in adrenal gland tumor
	h2-calponin	1	D86059							
40	H-2K binding factor-2	1	L08904		+	+	+		+	
	H3 histone family, member K (H3FK)	1	Z83735							
	H3 histone, family 3A (H3F3A)	7	M11353	+	+	+	+		+	high in ovary
	H3 histone, family 3B (H3.3B) (H3F3B)	15	Z48950	+	+	+	+		+	high in endothelial cells
45	hbc547	1	U68494		+	+	+	+		
	heat shock 27kD protein 1 (HSPB1)	1	U12404		+	+		+	+	
	heat shock 40kD protein 1 (HSPF1)	4	D85429	+	+	+	+	+	+	high in testis
	heat shock 60kD protein 1 (chaperonin) (HSPD1)	3	M22382	+	+	+	+	+	+	
50	heat shock 70kD protein 1 (HSPA1A)	7	M59828	+	+	+	+	+	+	high in activated T cells

5	heat shock 70kD protein 5 (glucose-regulated protein, 78kD) (HSPA5)	13	X87949		+	+		+			
	heat shock 70kD protein 6 (HSP70B1) (HSPA6)	4	X51757	+	+	+					
	heat shock 70kD protein 9B (mortalin-2) (HSPA9B)	2	L15189		+	+	+	+	+		
	HEAT SHOCK COGNATE 71 KD PROTEIN	1	P11142								
10	heat shock factor binding protein 1 (HSBP1)	2	AF068754								
	heat shock protein 90	13	M27024	+	+	+	+	+	+	+	high in many libraries
	heat shock protein, DNAJ-like 2 (HSJ2)	1	D13388		+	+		+	+		
15	Hect (homologous to the E6-AP (UBE3A) carboxyl terminus) domain and RCC1 (CHC1)-like domain (RLD) 1 (HERC1)	1	U50078		+	+	+				
	hect domain and RLD 2 (HERC2)	1	AB002391	+	+	+	+			+	
	helicase-like protein (HLP)	1	X98378	+	+		+			+	
	helix-loop-helix protein HE47 (E2A)	1	M65214								+
20	hematopoietic cell-specific Lyn substrate 1 (HCLS1)	18	X16863	+		+	+			+	
	heme oxygenase (decycling) 1 (HMOX1)	1	X06985		+		+	+	+		
	HEMOGLOBIN ALPHA CHAIN	1	P19015								
	hemoglobin beta (beta globin)	5	AF117710								
25	hemoglobin, alpha 1 (HBA1)	301	V00491			+			+	+	
	hemoglobin, alpha 1 (HBA1) (low match)	1	V00491								
	hemoglobin, alpha 1 (low match)	1	V00493								
	hemoglobin, alpha 1 (non-exact, 78%)	1	J00153								
30	hemoglobin, alpha 1 (non-exact, 82%)	1	V00493								
	hemoglobin, beta (HBB)	129	V00497	+	+	+	+	+	+	+	high in many libraries
	hemoglobin, beta (HBB) (low match)	1	V00497								
	hemoglobin, beta (HBB) (low match)	1	L48220								
35	hemokine (C-X-C motif), receptor 4 (fusin) (CXCR4)	1	D10924	+	+	+	+			+	
	hemopoietic cell kinase (HCK)	5	M16591				+			+	
	hepatitis C-associated microtubular aggregate protein p44	2	D28908								
	hepatoma-derived growth factor	1	D16431	+	+	+	+			+	
40	Hermansky-Pudlak syndrome (HPS)	2	U65876								
	HERV-E integrase (non-exact 76%aa)	1	AF026246								
	heterogeneous nuclear protein similar to rat helix destabilizing protein (FBRNP)	2	S63912		+	+	+			+	
45	heterogeneous nuclear ribonucleoprotein (C1/C2) (HNRPC)	4	M18342								
	heterogeneous nuclear ribonucleoprotein A/B (HNRPAB)	1	M65028	+	+	+	+	+	+		

5	heterogeneous nuclear ribonucleoprotein A1 (HNRPA1)	20	X12671	+	+	+	+	+	+	High in alveolar rhabdomyosarcoma
	heterogeneous nuclear ribonucleoprotein A2/B1 (HNRPA2B1)	3	M29064	+	+	+	+	+	+	High in activated T cell, fetal brain
	heterogeneous nuclear ribonucleoprotein D (hnRNP D)	2	D55673	+	+	+	+	+	+	
10	heterogeneous nuclear ribonucleoprotein D-like (HNRPDL)	5	D89092	+	+	+	+	+	+	
	heterogeneous nuclear ribonucleoprotein F (HNRPF)	1	L28010	+	+	+	+	+	+	
	heterogeneous nuclear ribonucleoprotein F (HNRPF) (83%)	1	L28010							
15	heterogeneous nuclear ribonucleoprotein G (HNRPG)	2	Z23064		+	+	+	+	+	
	heterogeneous nuclear ribonucleoprotein H (HNRPH) (FTP-3)	3	P55795							
20	heterogeneous nuclear ribonucleoprotein H (HNRPH) (low match)	1	P31943							
	heterogeneous nuclear ribonucleoprotein H1 (H) (HNRPH1)	2	L22009	+	+	+	+	+	+	
	heterogeneous nuclear ribonucleoprotein K (HNRPK)	21	S74678	+	+	+	+	+	+	
25	heterogeneous nuclear ribonucleoprotein R (HNRPR)	1	AF000364		+	+	+	+	+	
	heterogeneous nuclear ribonucleoprotein U (scaffold attachment factor A) (HNRPU)	3	X65488	+	+	+	+	+	+	
	hexokinase 1 (HK1)	2	X66957		+	+	+	+	+	
30	hexokinase 2 (HK2)	3	Z46376	+	+	+	+	+	+	
	hexokinase 3 (HK3)	2	U51333							
	hexosaminidase A (alpha polypeptide) (HEXA)	1	S62047							
	HGMP071 gene for olfactory receptor	2	U76377							
35	High density lipoprotein binding protein (HDLBP)	2	M64098	+	+	+	+	+	+	
	high-mobility group (nonhistone chromosomal) protein 1 (HMG1)	5	X12597	+	+	+	+	+	+	
	high-mobility group (nonhistone chromosomal) protein 1 (HMG1) (non-exact 80%)	1	D63874							
40	High-mobility group (nonhistone chromosomal) protein 17 (HMG17)	2	M12623	+	+	+	+	+	+	
	high-mobility group (nonhistone chromosomal) protein 2 (HMG2)	2	M83665	+	+	+	+	+	+	
45	high-mobility group (nonhistone chromosomal) protein isoforms I and Y	2	L17131	+	+	+	+	+	+	
	high-risk humanpapilloma viruses E6 oncoproteins targeted protein E6TP1 beta (=AB007900 KIAA0440)	1	AF090990.1							
50	histidine ammonia-lyase (HAL)	1	D16626				+	only		

5	histidyl-tRNA synthetase (HARS)	2	Z11518	+	+	+	+	+	+	
	histocompatibility antigen (HLA-Cw3), class I	1	U31372							
	histone deacetylase 1 (HDAC)	4	U50079	+	+	+	+		+	
	histone deacetylase 1 (HDAC1)	2	D50405	+	+	+	+		+	
10	histone deacetylase 5 (NY-CO-8)	1	AF039891		+	+				
	HK2 gene for hexokinase II	1	Z46382							
	HL9 monocyte inhibitory receptor precursor	2	U91928				+			
	HLA class I heavy chain (HLA-Cw*1701)	1								
15	HLA class I locus C heavy chain	1	X58536							
	HLA class II SB 4-beta chain	1	X03022							
	HLA class III region containing NOTCH4 gene	1	U89335	+	+	+	+		+	
	HLA-A	1	Z72423							
	HLA-A	2	AJ006020							
20	HLA-A*7402	1	AJ223060							
	HLA-A11	1	U02834							
	HLA-B	2	X75953							
	HLA-B	1	X83401							
	HLA-B	1	X78426							
25	HLA-B associated transcript-1 (D6S81E)	1	Z37166	+	+	+	+	+	+	
	HLA-B associated transcript-2 (D6S51E)	2	M33509	+	+	+	+			
	HLA-B*1528	4	D44501							
	HLA-Bw72 antigen	119	L09736	+	+	+	+	+	+	high in many libraries
	HLA-C gene (HLA-Cw*0701 allele)	1	D83957							
30	HLA-Cw*0701	9	Z46810							
	HLA-Cw*0801	1	D64151							
	HLA-Cw*1203	1	D64146							
	HLA-DC class II histocompatibility antigens alpha-chain (=K01160)	2	X00370							
35	HLA-DR alpha-chain	17	M60333	+	+	+	+	+	+	high in spleen
	HLA-F (leukocyte antigen F)	3	X17093			+	+		+	
	HMG box containing protein 1	3	AF019214							
	hMLH1 (=U83845)	1	AB017806.1							
	Hmob33	3	Y14155							
40	HMT1 (hnRNP methyltransferase, S. cerevisiae)-like 1 (HRMT1L1)	2	U80213	+	+	+	+		+	
	hnRNP C1/C2	2	D28382							
	homeobox (=X58250)	1	M60721							
45	Mouse homeo box protein, put. transcription factor involved in embryogenesis and hematopoiesis									
	homeobox protein (HLX1) (=M60721)	1	U14326							
	homeodomain-interacting protein kinase 3 (HIPK3)	1	AF004849	+		+	+		+	
	homolog of Drosophila past (PAST)	2	AF001434	+	+	+	+		+	
50	homolog of yeast (S. cerevisiae) ufd2 (UFD2)	3	D50916		+	+	+		+	

5	HPV16 E1 protein binding protein	1	U98131		+	+			+	
	HRHFB2157	1	AB015344		+	+			+	
	HRX-like protein (=AF010403 ALR)	1	Y08835							
	hsc70 gene for 71 kd heat shock cognate protein	3	Y00371							
10	HSPC012	1	AF077036.1							
	HSPC021	1	AF077207.1							
	HsPex13p	1	U71374							
	htra2-beta-2	1	U87835	+	+	+	+		+	
	HU-K4	1	U80644							
	hunc18b2	1	U63533		+	+	+		+	
15	HUNK1	1	Y12059	+	+		+	+	+	
	huntingtin-interacting protein HYPA/FBP11 (HYPA)	1	AF049528							
	hVps41p (HVPS41)	1	U87309							
20	hydroxyacyl-Coenzyme A dehydrogenase/3-ketoacyl-Coenzyme A thiolase/enoyl-Coenzyme A hydratase (trifunctional protein), alpha subunit (HADHA)	1	U04627		+	+		+		
	hydroxyacyl-Coenzyme A dehydrogenase/3-ketoacyl-Coenzyme A thiolase/enoyl-Coenzyme A hydratase (trifunctional protein), beta subunit (HADHB)	1	D16481	+	+	+	+		+	
25	hydroxysteroid (17-beta) dehydrogenase 1 (HSD17B1)	1	U34879		+			+		
	hypothetical protein	1								
30	hypothetical protein (AL008729) (dJ257A7.2)	1								
	hypothetical protein (CIT987SK_2A8_1 chromosome 8)	1	U96629							
	hypothetical protein (clone 24640)	1	AF055004							
	hypothetical protein (clone ICRFp507G2490)	1	Z70222							
35	hypothetical protein (dJ1042K10.4) (non-exact 76%)	1	AL022238							
	hypothetical protein (dJ465N24.1 similar to predicted yeast and worm proteins)	2	AL031432							
40	hypothetical protein (dJ487J7.1.1)	2	AL008730							
	hypothetical protein (dJ753P9.2)	2	AL023653							
	hypothetical protein (DKFZp588i111)	1	AL050131.1							
	hypothetical protein (J257A7.2)	1	AL008729							
45	hypothetical protein (KIAA0440) (=AF026504 R.norvegicus SPA-1 like protein)	1	AB007900							
	hypothetical protein (L1H 3' region)	1								
	hypothetical protein (S164)	1	P49756							

5	hypothetical protein (similar to thrombospondin) (non-exact 56%)	1	AF109907								
	hypothetical protein 3	1									
	hypothetical protein B (HSU47926) (non-exact, 56%)	1	U47926								
10	hypothetical protein from BCRA2 region (CG005)	3	U50532	+	+	+	+	+			
	hypoxia-inducible factor 1, alpha subunit (basic helix-loop-helix transcription factor) (HIF1A)	1	AF050115								
	Ia-associated invariant gamma-chain (clones lambda-y (1.2.3))	1	M13555								
15	iduronate 2-sulfatase (Hunter syndrome) (IDS)	2	M58342	+	+	+	+	+			
	Ig heavy chain V region (=D11016)	1	L20779								
	Ig heavy chain variable region	2	M34024								
	Ig heavy chain variable region (VH4DJ) (clone T14.4)	1	Z75378								
20	Ig heavy chain variable region (VH4DJ) (clone T22.18)	1	Z75392								
	Ig J chain	1	M12378								
	Ig kappa	1	S48007								
	Ig kappa light chain variable region A20	1	X63398								
25	Ig kappa light chain, V- and J-region (=X59315)	1	D90158								
	Ig lambda light chain variable region (26-34) (T111F120)	1	Z85052								
	Ig mu-chain VDJ4-region	1	M16949								
30	Ig rearranged anti-myelin kappa-chain (V-J4-region, hybridoma AE6-5)	1	M29469								
	Ig rearranged H-chain mRNA V-region	2	M97920								
	Ig rearranged light-chain V region (=D90158)	1	M74020								
35	IGF-II mRNA-binding protein 3 (KOC1) (non-exact, 75%)	1	U97188	+	+	+					
	IgG Fc binding protein (FC(GAMMA)BP)	1	D84239	+	+		+	+			
	IgG heavy chain variable region (VH26)	1	M83136								
	IgM heavy chain (C mu, membrane exons)	1	X14939								
40	IKB kinase-beta (IKK-beta)	1	AF029884								
	IL-1 receptor type II	1	U14177								
	IL2-inducible T-cell kinase (ITK)	2	S65186								
	immediate early protein (ETR101)	1	M62831	+			+	+		+	
	immunoglobulin light chain (lambda)	1	D87018								
45	immunoglobulin (CD79A) binding protein 1 (IGBP1)	1	Y08915	B, I	+	+		+			
	immunoglobulin C (mu) and C (delta) heavy chain (=K02878)	2	X57331								
	immunoglobulin G Fc receptor IIIB	1	Z45223								
50	immunoglobulin gamma 3 (Gm marker) (IGHG3)	3	Y14737	+				+		+	high in many libraries

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5	inducible protein (Hs.80313)	2	L47738	+	+	+	+	+	+	+
	inhibitor of DNA binding 2, dominant negative helix-loop-helix protein (ID2)	4	M97798	+	+	+	+	+	+	+
10	inhibitor of kappa light polypeptide gene enhancer in B-cells, kinase complex-associated protein (IKBKAP)	2	AF044195							
	inositol 1,3,4-trisphosphate 5/8-kinase	1	U51338	+	+	+	+	+	+	+
	inositol 1,4,5 trisphosphate receptor type 1 (ITPR1)	1	U23850		+	+	+			
	inositol 1,4,5-trisphosphate 3-kinase B (ITPKB)	2	X57206	B	+	+		+		
15	inositol monophosphatase	1	S38980							
	inositol polyphosphate-5-phosphatase, 145kD (INPP5D)	2	U84400	+	+	+	+		+	
	Ina(1,3,4,5)P4-binding protein	1	X89399		+				+	
	insulin-like growth factor 2 receptor (IGF2R)	5	Y00285	+	+	+	+		+	
20	integral membrane protein 1 (ITM1)	1	L38961			+	+		+	
	integral membrane protein 2C (ITM2C)	1	AF038953	I		+		+	+	
	integral membrane protein Tmp21-l (p23)	3	U61734	+	+	+	+	+	+	
	integrin beta 4 binding protein (ITGB4BP)	2	AF047433			+			+	
25	integrin, alpha 2b (platelet glycoprotein IIb of IIb/IIIa complex, antigen CD41B) (ITGA2B)	3	M34480		+			+		
	integrin, alpha 5 (fibronectin receptor, alpha polypeptide) (ITGA5)	4	X08258	+	+	+		+	+	
30	integrin, alpha L (antigen CD11A (p180), lymphocyte function-associated antigen 1; alpha polypeptide) (ITGAL)	6	Y00796							
	integrin, alpha M (complement component receptor 3, alpha; also known as CD11b (p170), macrophage antigen alpha polypeptide) (ITGAM)	1	M18044							
35	integrin, alpha X (antigen CD11C (p150), alpha polypeptide) (ITGAX)	1	M81695	+	+				+	
	integrin, beta 1 (fibronectin receptor, beta polypeptide, antigen CD29 includes MDF2 MSK12) (ITGB1)	2	X07979							
40	integrin, beta 2 (antigen CD18 (p95), lymphocyte function-associated antigen 1; macrophage antigen 1 (mac-1) beta subunit) (ITGB2)	32	M15395	+	+		+		+	
	integrin, beta 7 (ITGB7)	1	M68892	+						
45	Integrin-linked kinase (ILK)	1	U40282	+	+	+	+		+	
	intercellular adhesion molecule 1 (CD54), human rhinovirus receptor (ICAM1)	1	J03132	+				+	+	+
50	intercellular adhesion molecule 2 (ICAM2)	1	X15608	+	+	+	+		+	

5	intercellular adhesion molecule 3 (ICAM3)	6	X69819	+						+	
	intercellular adhesion molecule 4, Landsteiner-Wiener blood group (ICAM4)	1	L27670							+	
	Interferon consensus sequence binding protein 1 (ICSBP1)	1	M91196	W, T lymphoma							
10	Interferon consensus sequence binding protein 1 (ICSBP1) (low match)	1	M91196								
	interferon regulatory factor 2 (IRF2)	4	X15949	+	+	+	+				
	interferon regulatory factor1 (IRF1)	4	L05072	+	+	+	+			+	
15	interferon regulatory factor5 (IRF5)	1	U51127	+	+		+				
	interferon, gamma-inducible protein 16 (IFI16)	2	M63838	+	+	+	+			+	
	interferon, gamma-inducible protein 30 (IFI30)	9	J03909	+	+		+			+	
20	INTERFERON-INDUCED GUANYLATE-BINDING PROTEIN 1 (GUANINE NUCLEOTIDE-BINDING PROTEIN 1) (non-exact 62%)	1	P32455								
	interferon-induced protein 17 (IFI17)	3	X84958		+	+	+			+	
	interferon-induced protein 54 (IFI54)	5	M14660								
25	interferon-inducible (1-8D)	5	X57351	T		+		+	+		
	interferon-inducible (1-8U)	1	X57352			+		+	+		
	interferon-related developmental regulator 1 (IFRD1)	5	Y10313		+	+				+	
	interferon-stimulated transcription factor 3, gamma (48kD) (ISGF3G)	2	M87503		+		+			+	
30	interleukin 1 receptor, type II (IL1R2)	1	U64084				+				
	interleukin 10 receptor, beta (IL10RB)	1	U08988	T activated		+				+	
	interleukin 12 receptor, beta 1 (IL12RB1)	2	U03187	+							only found in T cell
	interleukin 13 receptor, alpha 1 (IL13RA1)	2	Y09328		+	+	+	+	+		
35	interleukin 16 (lymphocyte chemoattractant factor) (IL16)	6	U82972		+						
	interleukin 18 receptor 1 (IL18R1)	1	U43672								
	interleukin 2 receptor, beta (IL2RB)	9	M26082								
40	interleukin 2 receptor, gamma (severe combined immunodeficiency) (IL2RG)	6	D11088	+		+				+	
	interleukin 4 receptor (IL4R)	3	X52425	+	+		+			+	
	interleukin 6 receptor (IL6R)	5	X12830		+					+	
45	interleukin 6 signal transducer (gp130, oncostatin M receptor) (IL6ST)	1	M57230								
	interleukin 7 receptor (IL7R)	14	M29698	+						+	
	interleukin 7 receptor (IL7R) (low match)	1	AF043123								
50	interleukin 8 (IL8)	8	Y00787	+		+		+			High in activated T cells, bone and pancreatic islets

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interleukin 8 receptor alpha (IL8RA)	11	L19591									
interleukin 8 receptor, beta (IL8RB)	14	M94582									
interleukin enhancer binding factor 2, 45kD (ILF2)	3	U10323	+	+	+	+	+	+	+	high in uterus	
interleukin enhancer binding factor 3, 90kD (ILF3)	2	U10324									
interleukin-1 receptor-associated kinase 1 (IRAK1)	2	L76191		+	+	+			+		
interleukin-1 receptor-associated kinase 1 (low match)	1	U52112									
interleukin-10 receptor, alpha (IL10RA)	5	U00672	+	+	+	+					
interleukin-11 receptor, alpha (IL11RA)	7	Z38102		+	+						
INTERLEUKIN-14 PRECURSOR (IL-14) (HIGH MOLECULAR WEIGHT B-CELL GROWTH FACTOR) (HMW-BCGF) (non-exact 46%)	1	P40222									
intestinal carboxylesterase; liver carboxylesterase-2 (ICE)	1	U60553		+				+			
inversin protein (non-exact 52%)	1	AF084367									
IQ motif containing GTPase activating protein 1 (IQGAP1)	6	L33075									
IQ motif containing GTPase activating protein 2 (IQGAP2)	1	U51903		+		+					
isocitrate dehydrogenase 1 (NADP+), soluble (IDH1)	1	AF020038	+	+	+	+	+	+	+		
isocitrate dehydrogenase 2 (NADP+), mitochondrial (IDH2)	2	X69433	+	+	+	+	+	+	+		
isocitrate dehydrogenase 3 (NAD+) alpha (IDH3A)	2	U07681			+						
isocitrate dehydrogenase 3 (NAD+) gamma (IDH3G)	1	Z68907	+	+	+	+			+		
isolate Aus3 cytochrome b (CYTB)	1	AF042516									
isolate 1zCCR5-179 CCR5 receptor (CCR5)	1	AF011524									
isopentenyl-diphosphate delta isomerase (IDI1)	5	X17025	+	+	+	+			+		
Janus kinase 1 (a protein tyrosine kinase) (JAK1)	4	M64174	+	+	+	+			+		
Janus kinase 2 (a protein tyrosine kinase) (JAK2)	1	AF005216									
Jk-recombination signal binding protein (RBPJK)	2	L07876									
JM1 protein	1	AJ005890		+		+					
jumonji (mouse) homolog (JMJ)	1	U57592		+	+	+			+		
jun D proto-oncogene (JUND)	1	X51346	+	+	+	+			+		
jun dimerization protein	1	AF111167								only found in germ	
junction plakoglobin (JUP)	1	M23410		+	+	+			+		

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5	kangal 1 (suppression of tumorigenicity 6, prostate; CD82 antigen (R2 leukocyte antigen, antigen detected by monoclonal antibody IA4)) (KA11)	1	U20770	+	+	+	+	+	+	
	karyopherin (importin) beta 1 (KPNB1)	2	L39793	+	+	+	+	+	+	
10	karyopherin (importin) beta 2 (KPNB2)	1	U72395	+	+	+	+			
	karyopherin alpha 1 (importin alpha 5) (KPNA1)	1	S75295	+	+	+		+		
	karyopherin alpha 2 (RAG cohort 1, importin alpha 1) (DPNA2)	1	U09559							
15	karyopherin alpha 3 (importin alpha 4) (KPNA3)	1	D89618		+			+		
	karyopherin alpha 4 (KPNA4)	1	M17887		+	+				
	Katanin (80 kDa) (KA1)	1	AF052432		+	+	+		+	
	KEO3 protein	2	AF064604							
20	Reich-like ECH-associated protein 1 (KIAA0132) (66%aa)	1	D50922							
	Keratin 8 (KRT8)	1	X74929		+	+	+	+	+	
	ketohexokinase (fructokinase) (KHK)	1	X78678		+			+	+	
	KIAA0001 (KIAA0001) (72% aa)	1	Q15391							
	KIAA0001 (KIAA0001) (76% aa)	1	Q15391							
25	KIAA0001 (KIAA0001) (non-exact 72%)	1	Q15391							
	KIAA0002 (KIAA0002)	5	D13827		+	+	+		+	
	KIAA0005 (KIAA0005)	4	D13830		+	+	+		+	
	KIAA0010 (KIAA0010)	1	D13835		+				+	
	KIAA0016 (KIAA0016)	1	D13841	+	+	+	+		+	
30	KIAA0017 (KIAA0017)	2	D87686							
	KIAA0022 (KIAA0022)	2	D14664		+	+	+			
	KIAA0023 (KIAA0023)	1	D14689		+					
	KIAA0024 (KIAA0024)	1	D14694	+	+	+	+		+	
	KIAA0025 (KIAA0025)	1	D14695		+	+	+	+	+	
	KIAA0026 (KIAA0026)	2	D14812		+	+	+		+	
35	KIAA0027	1	D25217		+					
	KIAA0032 (KIAA0032)	2	D25215		+	+	+			
	KIAA0040 (KIAA0040)	1	D25539	+	+	+	+		+	
	KIAA0050 (KIAA0050)	4	D26069							
	KIAA0053 (KIAA0053)	17	D29642	+		+	+			
40	KIAA0057 (KIAA0057)	1	D31762	+	+	+	+	+	+	high in fetal lung
	KIAA0058 (KIAA0058)	11	D31767	+		+	+		+	
	KIAA0063 (KIAA0063)	3	D31884	+	+	+	+		+	
	KIAA0064 (KIAA0064)	1	D31764	+	+	+	+		+	
	KIAA0066	1	D31886	+	+	+	+		+	
	KIAA0068	1	D38549		+	+	+	+	+	
45	KIAA0073	3	D38552		+	+	+		+	
	KIAA0081	2	D42039		+		+		+	
	KIAA0084	2	D42043	+	+	+	+		+	
	KIAA0085	26	U30498	+	+	+	+	+	+	
	KIAA0088	3	D42041	+	+	+	+	+	+	
	KIAA0090	2	D42044	+	+	+	+	+	+	
50	KIAA0092 (KIAA0092)	1	D42054		+	+	+		+	

5	KIAA0239 (non-exact 80%)	1	D87076								
	KIAA0240	1	D87077								
	KIAA0242	4	D87684	+	+	+	+	+	+		
	KIAA0248	2	D87435		+	+	+	+	+		
	KIAA0249 (KIAA0249)	3	D87436	+	+	+	+	+	+		
	KIAA0253	5	D87442	+	+	+	+	+	+		
10	KIAA0254 (KIAA0254)	1	D87443		+	+	+				
	KIAA0255(KIAA0255)	4	D87444		+	+	+	+	+		
	KIAA0262 (KIAA0262)	3	D87451	+	+	+	+	+	+		
	KIAA0263 (KIAA0263)	1	D87452	+	+	+	+	+	+		
	KIAA0264	3	D87453		+	+	+	+	+		
	KIAA0268	1	D87742	+	+		+		+		
15	KIAA0269	1	Q92558								
	KIAA0275 (KIAA0275)	13	D87465	+	+		+		+		
	KIAA0304 (KIAA0304)	2	AB002302	+	+	+	+	+	+		
	KIAA0308	2	AB002306		+	+			+		
	KIAA0310 (KIAA0310)	1	AB002308		+	+	+	+	+		
	KIAA0314 (=U96635 M.musculus ubiquitin protein ligase Nedd-4)	3	AB002312								
20	KIAA0315 (KIAA0315)	4	AB002313		+	+	+	+	+		
	KIAA0325 (=L08505 R.norvegicus cytoplasmic dynein heavy chain (MAP 1C))	2	AB002323								
25	KIAA0329 (KIAA0329)	1	AB002327		+	+	+		+		
	KIAA0330	1	AB002328	+	+	+			+		
	KIAA0332	1	AB002330		+	+	+	+	+		
	KIAA0333	2	AB002331		+	+	+	+	+		
	KIAA0336 (KIAA0336)	3	AB002334	+	+	+	+	+	+		
	KIAA0336 (KIAA0336) (low match)	1	AB002334								
30	KIAA0342 (KIAA0342)	1	AB002340		+	+			+		
	KIAA0344 (KIAA0344)	2	AB002342				+		+		
	KIAA0354 (KIAA0354)	1	AB002352	+	+	+	+	+	+		
	KIAA0365 (KIAA0365)	3	AB002363	+	+	+	+	+	+		
	KIAA0370	6	AB002368		+	+	+	+	+		
35	KIAA0372 (KIAA0372)	1	AB002370								
	KIAA0373 (KIAA0373)	1	AB002371		+		+				
	KIAA0375 (KIAA0375)	1	AB002373		+		+				
	KIAA0377 (KIAA0377)	1	AB002375		+		+	+			
	KIAA0379	1	AB002377				+				
	KIAA0379 (non-exact, 65%)	1	AB002377								
40	KIAA0380 (KIAA0380)	1	AB002378	+	+		+		+		
	KIAA0380 (KIAA0380) (60%aa)	1	AB002378								
	KIAA0382 (KIAA0382)	2	AB002380		+	+	+		+		
	KIAA0383	1	AB002381								
	KIAA0386 (KIAA0386)	5	AB002384								
45	KIAA0392	1	AB002390								
	KIAA0397 (KIAA0397)	4	AB007857		+	+	+	+	+		
	KIAA0403	3	AB007863								
	KIAA0404	1	AB007864		+		+				
	KIAA0409	1	AB007869		+		+				
	KIAA0421	1	AB007881	+	+	+			+		
50	KIAA0424 (non-exact 82%)	1	AB007884								

PCT/CA00/00005

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KIAA0680 (KIAA0680)	1	AB014580								
KIAA0692	1	AB014592	+	+	+	+			+	
KIAA0697	1	AB014597								
KIAA0699	1	AB014599	+	+	+	+			+	
KIAA0700	1	AB014600		+	+	+			+	
KIAA0737 (KIAA0737)	3	AF014837	+	+	+	+			+	
KIAA0748 (KIAA0748)	2	AB018291		+						
KIAA0763 (KIAA0763)	2	AB018306	+	+	+	+			+	
KIAA0769 (KIAA0769)	2	AB018312		+	+	+			+	
KIAA0782	1	AB018325	+	+	+	+				high in BPH stroma
KIAA0796	1	AB018339		+	+	+			+	
KIAA0798 (KIAA0798)	1	AB018341								
KIAA0823	1	AB020630								
KIAA0854	1	AB020661	+	+	+	+			+	
KIAA0856	1	AB020663		+	+	+			+	
KIAA0860	1	AB020667		+	+	+				
KIAA0862	1	AF054828		+	+	+				
KIAA0871 (non-exact 88%)	1	AB020678								
KIAA0873	1	AB020680		+	+	+			+	
KIAA0892	1	AB020699	+	+	+	+			+	
KIAA0906	1	AB020713	+	+	+	+			+	
KIAA0991	1	AB023208.1								
killer cell lectin-like receptor subfamily B, member 1 (KLRB1)	1	U11276			+	+			+	
killer cell lectin-like receptor subfamily C, member 4 (KLRC4)	1	U98846								
kinectin 1 (kinesin receptor) (KTN1)	1	D13629								
kinesin family member 5B (KIF5B)	2	X65873		+	+	+				
kinesin-like DNA binding protein	1	AB017430	+	+	+	+			+	
Kruppel-related DNA-binding protein (TF6) (low match)	1	M61869								
Kruppel related gene (clone pHR1RS)	1	M20675								
Kruppel-like zinc finger protein Zf9	3	U51869	+	+	+	+	+	+	+	
Kruppel-like zinc finger protein Zf9 (non-exact 76%)	1	U44975		+	+			+	+	
Kruppel-type zinc finger protein, ZK1	1	AB011414.1								
L apoferritin	3	X03742								
lactate dehydrogenase A (LDHA)	3	X02152		+	+	+	+	+	+	
lactate dehydrogenase A (LDHA) (non-exact, 81%)	1	X02152								
lactate dehydrogenase B (LDHB)	6	X13794	+	+	+	+	+	+	+	high in fetal lung fibroblast
lactotransferrin (LTF)	1	U07643	+			+		+		high in bone marrow
laminin binding protein (low score)	1	D28372								
laminin receptor 1 (87kD); Ribosomal protein SA (LAMR1)	20	X15005	+	+	+	+	+	+	+	high in many libraries
laminin receptor homolog (3' region)	1	S35960								
laminin, gamma 1 (formerly LAMB2) (LAMC1)	2	J03202	+	+	+				+	

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latent transforming growth factor beta binding protein 1 (LTBP1)	2	M34057		+	+	+	+	+	
LAZ3/BCL6 (=Z79582:D28522/4)	1	Z79581							
LDLC	2	Z34975	+	+	+	+	+	+	
lecithin-cholesterol acyltransferase (LCAT) (non-exact, 66%)	1	M17959							
lectin, galactoside-binding, soluble, 2 (galectin 2) (LGALS2)	1	M87842				+			
lectin, galactoside-binding, soluble, 3 binding protein (galectin 6 binding protein) (LGALS3BP)	1	L13210	+	+	+	+	+	+	
leucine rich repeat (in FLII) interacting protein 1 (LRRFIP1)	5	AJ223075	+	+	+	+	+	+	
leucocyte immunoglobulin-like receptor-5 (LIR-5)	2	AF072099				+			
leucocyte immunoglobulin-like receptor-6a (LIR-6)	7	AF025530							
leucocyte immunoglobulin-like receptor-7 (LIR-7)	2	U82275		+					only found in CNS
leukemia virus receptor 1 (GLVR1)	1	L20859	+	+	+	+	+	+	
leukocyte adhesion protein p150.95 alpha subunit	1	M29484							
leukocyte antigen, HLA-A2	3	Y13267							
leukocyte immunoglobulin-like receptor (MIR-10)	3	AF025528		+					
leukocyte tyrosine kinase (LTK)	1	X60702	+						found only in blood
leukocyte-associated Ig-like receptor 1 (LIAR1)	3	AF013249				+			
leukotriene A4 hydrolase (LTA4H)	6	J03459	+	+	+	+	+	+	
leupaxin (LDPL)	2	AF062075	+			+		+	
ligase I, DNA, ATP-dependent (LIG1)	1	M36067	B, I	+	+		+	+	
LIM and SH3 protein 1 (LASP1)	2	X82456	+	+	+	+	+	+	
LIM domain kinase 2 (LIMK2)	2	AC002073	+	+	+	+		+	
line-1 protein	1								
Line-1 repeat mRNA with 2 open reading frames	1	U93566	+	+	+	+	+	+	
Line-1 repeat with 2 open reading frames	1	M22332	+	+	+	+	+	+	high in gastric tumor
LINE-1 REVERSE TRANSCRIPTASE HOMOLOG	1	P08547							
lipase A, lysosomal acid, cholesterol esterase (Wolman disease) (LIPA)	4	X76488	+	+	+	+		+	
lipase, hormone-sensitive (LIPE)	1	L11706	+	+				+	
LMP7	1	L11045							
Lon protease-like protein (LONP)	2	X74215	+	+	+	+		+	
low density lipoprotein-related protein 1 (alpha-2-macroglobulin receptor) (LRP1)	2	AF058414					+		only in liver
low density lipoprotein-related protein-associated protein 1 (alpha-2-macroglobulin receptor-associated protein 1) (LRPAP1)	1	M63959		+	+		+	+	

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	low density lipoprotein-related protein-associated protein 1 (alpha-2-macroglobulin receptor-associated protein 1) (LRPAP1) (non-exact, 75%)	1	M63959								
5	low-affinity Fc-gamma receptor IIA	1	L08107								
10	LPS-induced TNF-alpha factor (PIG7)	9	AF010312	+	+	+	+	+	+		
	Lst-1	1	U00921	+	+	+	+			+	
	L-type amino acid transporter subunit LAT1	1	AF104032								
	lung resistance-related protein (LRP)	1	X79882	+	+	+	+			+	
15	Lymphocyte antigen 75 (LY75)	1	AF011333	B							
	lymphocyte antigen 9 (LY9)	2	L42621								
	lymphocyte antigen HLA-B*4402 and HLA-B*5101	2	L42345								
	lymphocyte cytosolic protein 1 (L-plastin) (LCP1)	42	J02923								
20	lymphocyte cytosolic protein 2 (SH2 domain-containing leukocyte protein of 76kD) (LCP2)	4	U20158								lymphoma, T activated
	lymphocyte glycoprotein T1/Leu-1	2	X04391	+			+				
	lymphocyte-specific protein 1 (LSP1)	16	M33552	+	+	+	+			+	
25	lymphocyte-specific protein tyrosine kinase (LCK)	7	M36881		+					+	
	lymphoid phosphatase LyP1	1	AF001847								
	lymphoid-restricted membrane protein (LRMP)	4	U10485	+		+	+				
	lymphoid-specific SP100 homolog (LYSP100-A)	1	U36500								+
30	lymphoma protein convertase (LPC)	2	U33849	+	+	+	+			+	
	LYSOSOMAL PROTECTIVE PROTEIN PRECURSOR (CATHEPSIN A) (CARBOXYPEPTIDASE C)	1	P10619								
35	lysosomal-associated membrane protein 1 (LAMP1)	1	J04182	+	+	+	+	+	+	+	
	Lysosomal-associated membrane protein 2 (LAMP2)	1	J04183		+	+	+	+	+	+	
	lysozyme (renal amyloidosis) (LYZ)	39	M19045	+	+	+	+			+	
	lysyl-tRNA synthetase (KARS)	2	D32053	+	+	+	+			+	
40	M phase phosphoprotein 10 (U3 small nucleolar ribonucleoprotein) (MPP-10)	1	X98494								
	M1-type and M2-type pyruvate kinase	2	X56494								
	m6A methyltransferase (MT-A70)	7	AF014837	+	+		+				
45	mab-21 (C. elegans)-like 1 (MAB21L1)	1	U38810		+	+	+			+	
	MacMarcks	1	X70326	+	+	+	+	+	+	+	
	macrophage-associated antigen (MM130)	1	Z22968		+	+	+			+	

5	MADS box transcription enhancer factor 2, polypeptide A (myocyte enhancer factor 2A) (MEF2A)	1	U49020		+	+	+		+	
10	MADS box transcription enhancer factor 2, polypeptide C (myocyte enhancer factor 2C) (MEF2C)	1	L08895		+	+	+		+	
	major cytoplasmic tRNA-Val(IAC) (=M33940)	1	X17516							
	major histocompatibility complex class I beta chain (HLA-B)	1	M95531							
15	major histocompatibility complex, class I, A (HLA-A)	41	Z93949	+	+	+	+		+	high in villous adenoma
	major histocompatibility complex, class I, A (HLA-A) (low match)	1	Z72422							
	major histocompatibility complex, class I, C (HLA-C)	82	M24097	+	+	+	+	+	+	
	major histocompatibility complex, class I, E (HLA-E)	77	M20022	+	+	+	+		+	
20	major histocompatibility complex, class II, DM BETA (HLA-DMB)	2	U15085	+	+	+	+		+	
	major histocompatibility complex, class II, DP beta 1 (HLA-DPB1)	10	M57468	+	+	+	+		+	
	major histocompatibility complex, class II, DR beta 1 (HLA-DRB1)	9	V00522	+	+	+	+		+	
25	Major histocompatibility complex, class II, Y box-binding protein I; DNA-binding protein B (YB1)	2	M24070		+	+		+	+	
	malate dehydrogenase 1, NAD (soluble) (mdh1)	1	D55654	+	+	+	+	+	+	
30	malate dehydrogenase 1, NAD (soluble) (MDH1)	3	D55654		+	+		+	+	
	malonyl-CoA decarboxylase precursor	2	AF097832							
	maltase-glucoamylase (mg)	1	AF016833				+			
	manic fringe (Drosophila) homolog (MFNG)	1	U94352	+	+	+	+		+	
35	mannose phosphate isomerase (MPI)	1	X76057		+	+	+		+	
	mannose phosphate isomerase (mpi)	2	X76057		+	+	+		+	
	mannose-6-phosphate receptor (cation dependent) (M6PR)	3	X56253		+	+		+	+	
	mannose-P-dolichol utilization defect 1 (MPDU1)	1	AF038981		+	+	+		+	
40	mannosidase, alpha B, lysosomal (MANB)	1	U60885		+		+	+	+	
	mannosyl (alpha-1,3)-glycoprotein beta-1,2-N-acetylglucosaminyltransferase (MGAT1)	1	M55621	+	+	+	+	+	+	
	map 4q35 repeat region	1	AF084849							
45	MAP kinase-interacting serine/threonine kinase 1 (MKNK1)	2	AB000409		+	+	+	+	+	
	MAP/ERK kinase kinase 3 (MEKK3)	5	U78876		+					
	MAP/ERK kinase kinase 5 (MEKK5)	1	D84476		+	+		+		

5	MAP/microtubule affinity-regulating kinase 3 (MARK3)	4	M80359		+	+				+	
	Marenostatin protein	1	Y14441								
	MASL1	1	AB016816								
	MAX dimerization protein (MAD)	3	L06895							+	
10	MaxiK potassium channel beta subunit	1	AF035046								
	MBP-2 for MHC binding protein 2	1	X65644		+	+	+			+	
	Mers (mouse) homolog 3 (MEIS3)	1	U68385		+	+	+			+	
	melanoma-associated antigen p97 (melanotransferrin)	1	M12154								
15	membrane cofactor protein (CD46, trophoblast-lymphocyte cross-reactive antigen) (MCP)	4	X59405		+	+	+			+	
	membrane component, chromosome 17, surface marker 2 (ovarian carcinoma antigen CA125) (M17S2)	4	D14696		+	+	+	+	+		
20	membrane metallo-endopeptidase (neutral endopeptidase, enkephalinase, CALLA, CD10) (MME)	2	J03779	B		+	+	+	+	+	
	membrane protein, palmitoylated 1 (55kD) (MPP1)	2	M64925		+	+	+	+	+	+	
25	meningioma expressed antigen (MGEA)	1	U94780				+				
	meningioma-expressed antigen 11 (MEA11)	1	U73682	+	+		+	+			
	Menkes Disease (ATP7A) putative Cu ⁺⁺ -transporting P-type ATPase	1	L08133		+						
30	metallothionein 2A (MT2A)	1	V00594		+	+	+	+	+	+	
	metaxin 1 (MTX1)	1	U46920		+		+	+	+	+	
	methionine adenosyltransferase II, alpha (MAT2A)	2	X68836	+	+	+	+	+	+	+	
	methyl-CpG binding domain protein 1 (MBD1) (non-exact 59%aa)	1	Y10746								
35	methylene tetrahydrofolate dehydrogenase (NAD ⁺ dependent), methenyltetrahydrofolate cyclohydrolase (MTHFD2)	2	X16396	+	+	+	+			+	
	methylene tetrahydrofolate dehydrogenase (NADP ⁺ dependent), methenyltetrahydrofolate cyclohydrolase, formyltetrahydrofolate synthetase (MTHFD1)	1	J04031		+	+	+	+	+	+	
40	methyltransferase, putative	2	AJ224442								
	MHC antigen (HLA-B) (=L42024)	1	U14943								
45	MHC class I region	2	AF055066								
	MHC class I antigen (HLA-A2)	1	U70863								
	MHC class I antigen (HLA-A33)	1	U19736								
	MHC class I antigen (HLA-C)	1	U38975								

	MHC class I antigen B*5801 (HLA-B)	1	U52813						
5	MHC class I antigen HLA-A (HLA-A)	2	AF015930						
	MHC class I antigen HLA-A (HLA-A-2402 allele)	1	U36887						
	MHC class I antigen HLA-A11K	2	X13112						
10	MHC class I antigen HLA-B (B*0801 variant) (=AF028598)	1	U67331						
	MHC class I antigen HLA-B (B*0801 variant) (=U88254)	1	U67330						
	MHC class I antigen HLA-B (B*48 allele)	1	AF017328						
	MHC class I antigen HLA-B (HLA-B*1502 allele)	1	AF014770						
15	MHC class I antigen HLA-B (HLA-B*40MD)	1	U58843						
	MHC class I antigen HLA-B (HLA-B*4103 allele)	1	AF028598						
	MHC class I antigen HLA-B gene (HLA-B*4402 variant allele)	1	AF035648						
20	MHC class I antigen HLA-B GN00110-B*3910	1	U52175						
	MHC class I antigen HLA-Cw*04011	1	D83030						
	MHC class I antigen R69772 HLA-A (A*0302)	1	U56434						
	MHC class I antigen SHCHA (HLA-B*4403 variant)	1	U58469						
25	MHC class I histocompatibility antigen (HLA-B) (clone C21/14)	1	U06697						
	MHC class I HLA B71	2	L07950						
	MHC class I HLA-A (Aw33.1)	1	Fip						
	MHC class I HLA-B	1	U18660						
30	MHC class I HLA-B (HLA-B-07ZEL allele) (=X866704)	1	U18661						
	MHC class I HLA-B (HLA-B-08NR allele)	1	U28759						
	MHC class I HLA-B*3512	1	L76094						
	MHC class I HLA-B41 variant (=U17572)	3	U17572						
35	MHC class I HLA-B44.2 chain	1	M24038						
	MHC class I HLA-B51-cd3.3	1	L41086						
	MHC class I HLA-C allele	2	Z33459						
	MHC class I HLA-Cw*0304 (=M84172; M99389)	1	D64150						
40	MHC class I HLA-Cw*0803	3	Z15144						
	MHC class I HLA-Cw6	1	M28206						
	MHC class I HLA-J antigen	1	L56139						
	MHC class I lymphocyte antigen A2 (A2.1) variant DK1	1	M19670						
	MHC class I mic-B antigen	1	X91625						
45	MHC class I polypeptide-related sequence A (MICA)	1	L14848				+		
	MHC class I protein HLA-C heavy chain (C*0701new allele) (=AF017331)	1	U61274						
	MHC class II DNA Sequence (clone A37G7-1C11)	1	L18885						

5	MHC class II DQ-alpha associated with DRw6, DQw1 protein	1	M16995	+		+	+	+	+	
	MHC class II DQ-beta associated with DR2, DQw1 protein	2	M17564		+		+		+	
	MHC class II HAL-DQ-LTR5 (DQ.w8) DNA fragment, long terminal repeat region	1	M33842							
10	MHC class II HLA-dr alpha-chain (=J00197:M60334;K01117;J00194:M60333;X00274)	1	J00195							
	MHC class II HLA-DRB1	1	AF007883							
	MHC class II HLA-DRw11-beta-1 chain (DRw11.3)	1	M21966							
15	MHC class II lymphocyte antigen (DPw4-beta-1)	1	M23907							
	MHC CLASS II TRANSACTIVATOR CIITA (non-exact 57%)	1	P33076							
	MHC HLA-E2.1 (=X87679)	1	M32507							
	MHC HLA-E2.1 (alpha-2 domain) (low match)	1	M32507							
20	Mt-2 autoantigen 240 kDa protein (non-exact 84%)	1	U08379							
	microsomal stress 70 protein ATPase core (stch)	1	U04735							
	microtubule-associated protein 4 (MAP4)	1	U19727	+	+	+	+		+	
	microtubule-associated protein 7 (MAP7)	1	X73882							
25	mineralocorticoid receptor (aldosterone receptor) (MLR)	2	M16801		+		+		+	
	minichromosome maintenance deficient (S. cerevisiae) 3 (MCM31)	1	X62153		+	+	+		+	
	minichromosome maintenance deficient (S. cerevisiae) 3-associated protein (MCM3AP)	1	AB011144		+	+	+		+	
30	minichromosome maintenance deficient (S. cerevisiae) 5 (cell division cycle 46) (MCM5)	2	X74795	+	+	+	+	+	+	
	mitochondrial cytochrome b (CYTB)	1	AF042517							
35	mitochondrial 16S rRNA	11	Z70759							
	mitochondrial ATP synthase (F1-ATPase) alpha subunit	2	X59066							
	mitochondrial ATP synthase c subunit (P1 form)	1	X69907							
40	mitochondrial cytochrome b (CYTB)	6	AF042508							
	mitochondrial cytochrome b small subunit of complex II	1	AB006202							
	mitochondrial CYTOCHROME C OXIDASE POLYPEPTIDE I	1	P00395							
45	mitochondrial CYTOCHROME C OXIDASE POLYPEPTIDE II	1	P00403							
	mitochondrial cytochrome C oxidase subunit II	2	P00403							

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murine leukemia viral (bmi-1) oncogene homolog (BMI1)	1	L13689		+		+			+	
mutant (Daudi) beta2-microglobulin	44	X07621								
mutated in colorectal cancers (MCC)	1	M62397		+	+				+	
myeloid cell leukemia sequence 1 (BCL2-related) (MCL1)	9	L08248	+	+	+	+	+	+	-	
myeloid cell nuclear differentiation antigen (MNDA)	11	M81750	+						+	
myeloid differentiation primary response gene (88) (MYD88)	4	U70451		+	+	+			+	
myeloid leukemia factor 2 (MLF2)	3	U57342		+		+			+	
myeloid/lymphoid or mixed-lineage leukemia (trithorax (Drosophila) homolog); translocated to, 7 (MLLT7)	8	U89867		+	+	+			+	
MYH9 (cellular myosin heavy chain)	1	M81105								
myomesin (M-protein) 2 (165kD) (MYOM2)	1	X69088								
myosin IE (MYOIE)	11	X98411		+		+				
myosin light chain kinase (MLCK)	1	U48959	+		+	+			+	
myosin phosphatase, target subunit 1 (MYPT1)	2	D87930		+	+	+			+	
myosin regulatory light chain (=U26162)	2	D50372								
myosin VIIa (low match 71)	1	U55208								
myosin, heavy polypeptide 9, non-muscle (MYH9)	3	M81105	+	+	+	+			+	
myosin, light polypeptide, regulatory, non-sarcomeric (20kD) (MLCB)	6	X54304	+	+	+	+	+	+		
myosin-I beta	1	X98507	+	+	+	+			+	
myristoylated alanine-rich protein kinase C substrate (MARCKS, 80K-L) (MACS)	1	D10522		+	+					
myxovirus (influenza) resistance 1, homolog of murine (interferon-inducible protein p78) (MX1)	1	M30817	+	+	+	+			+	
myxovirus (influenza) resistance 2, homolog of murine (MX2)	3	M30818			+					
N-acetylgalactosaminidase, alpha- (NAGA)	2	M62783		+	+				+	+
N-acetylglucosamine receptor 1 (thyroid) (NAGR1)	1	L03532		+	+	+			+	
NACP/alpha-synuclein	2	U48896								
N-acylaminoacyl-peptide hydrolase (APEH)	1	D38441		+	+				+	+
N-acylsphingosine amidohydrolase (acid ceramidase) (ASAH)	11	U47674	+	+	+	+			+	
NAD+-specific isocitrate dehydrogenase beta subunit precursor (encoding mitochondrial protein)	1	U49283	+	+	+	+	+	+	+	
NADH dehydrogenase (ubiquinone) 1 alpha subcomplex, 5 (13kD, B13) (NDUFA5)	1	U53468.1	+	+	+	+	+	+	+	

5	NADH dehydrogenase (ubiquinone) 1 beta subcomplex, 5 (16kD, SGD1) (NDUF85)	1	AF047181		+	+	+	+	+	
	NADH dehydrogenase (ubiquinone) Fe-S protein 2 (49kD) (NADH-coenzyme Q reductase) (NDUF52)	1	AF050640		+	+	+	+	+	
10	NADH dehydrogenase (ubiquinone) flavoprotein 2 (24kD) (NDUFV2)	1	M22538			+	+	+	+	
	NADH:ubiquinone dehydrogenase 51 kDa subunit (NDUFV1)	2	AF053070	+	+	+	+	+	+	
	NADH-CYTOCHROME B5 REDUCTASE (B5R) (50%aa)	1	P00387							
15	NADH-UBIQUINONE OXIDOREDUCTASE CHAIN 1	1	P03886							
	Nardilysin (N-arginine dibasic convertase) (NRD1)	2	U64898	+	+	+	+		+	
	nascent-polypeptide-associated complex alpha polypeptide (NACA)	5	X80909		+	+		+	+	
20	natural killer cell group 7 sequence (NKG7)	8	S69115				+		+	
	natural killer cell transcript 4 (NK4)	19	M32011	+						
	natural killer-associated transcript 3 (NKAT3)	1	U30274	+						blood only
25	natural killer-associated transcript 5 (NKAT5)	1	AF022045	+						blood only
	natural killer-tumor recognition sequence (NKTR)	1	L04288	B		+		+	+	
	N-deacetylase/N-sulfotransferase (heparan glucosaminyl) 2 (NDST2)	2	AF042084	+	+		+		+	
30	Ndr protein kinase	3	Z35102		+					
	Nedd-4-like ubiquitin-protein ligase WWP1	1	U98113							
	nel (Chicken)-like 2 (NEL2)	3	D83018		+	+				
	N-ethylmaleimide-sensitive factor attachment protein, alpha (NAPA)	1	U39412		+				+	
35	N-ethylmaleimide-sensitive factor attachment protein, gamma (NAPG)	1	U78107		+	+	+			
	neural precursor cell expressed, developmentally down-regulated 5 (NEDD5)	3	X92544	+	+	+	+		+	high in testis
40	neural precursor cell expressed, developmentally down-regulated 8 (NEDD8)	1	D23862	+	+	+	+	+	+	
	neuregulin 1 (NRG1)	1	U02330		+		+	+		
	neuroblastoma RAS viral (v-ras) oncogene homolog (NRAS)	4	AB020692	+	+	+	+		+	
45	Neuroblastoma RAS viral (v-ras) oncogene homolog (NRAS) (low match)	1	X68288							
	Neurofibromin 2 (bilateral acoustic neuroma) (NF2)	1	S73853		+				+	
	neuronal apoptosis inhibitory protein (NAIP)	2	U19251	+	+	+			+	
50	neuronal cell adhesion molecule (NRCAM)	1	AB002341		+	+	+		+	

5	neuropathy target esterase (NTE)	1	AJ004832		+	+	+		+	
	neuropeptide Y3 receptor, 5'UTR (low score)	1	D28433							
	neurotrophic tyrosine kinase, receptor, type 1 (NTRK1)	14	X03541	+	+	+	+	+	+	
	neutrophil cytosolic factor 4 (40kD)	2	U50720							
10	NG31	1	AF129756							
	NGAL (=X83006)	1	X99133							
	nibin (NBS)	1	AF051334							
	NIK	1	AB014587		+	+	+		+	
	Ninjurin 1: nerve injury-induced protein-1	1	U72661		+	+	+		+	
15	nitrilase 1 (NIT1) (=AF069984)	1	AF069987							
	NKG2-D (low match) (non-exact, 58%)	1	X54870							
	Nmi	1	U32849							
	N-myristoyltransferase 1 (NMT1)	1	AF043324		+	+	+	+	+	
20	No arches-like (zebrafish) zinc finger protein (NAR)	1	U79569		+	+	+		+	
	non-histone chromosome protein 2 (S. cerevisiae)-like 1 (NHP2L1)	1	D50420	+	+	+	+	+	+	
	non-muscle (fibroblast) tropomyosin	1								
	non-muscle alpha-actinin	1	U48734							
25	non-muscle myosin alkali light chain (Hs.77385)	3	M22918	+	+	+	+	+	+	High in fetal adrenal gland and BPH stroma
	non-neuronal enolase (EC 4.2.1.11)	1	X16289							
	non-receptor tyrosine phosphatase 1	1	M33689							
30	normal keratinocyte subtraction library mRNA, clone H22a	3	X53778	+	+	+	+	+	+	high in many libraries
	notch group protein (N)	3	M99437							
	novel protein	1	X99961							
	novel T-cell activation protein	1	X94232		+	+	+		+	
	N-ras protein NRU	1	A60196							
35	N-sulfoglucosamine sulfoxidase (sulfamidase) (SGSH)	1	U60111		+				+	
	nsulin induced gene 1 (INSIG1)	1	U96876	+	+	+	+	+	+	
	ntegrin, alpha 4 (antigen CD49D, alpha 4 subunit of VLA-4 receptor) (ITGA14)	3	L12002	+			+			
40	nterferon, gamma-inducible protein 16 (IFI16)	1	M63838	+	+	+	+		+	
	nterleukin 1, beta (IL1RB)	1	M15330							
	nuclear antigen H731-like protein	2	U83908		+	+	+		+	
	nuclear antigen Sp100 (SP100)	4	U36501	+			+	+	+	
45	Nuclear antigen Sp100 (SP100) (85%aa)	1	P23497							
	Nuclear antigen Sp100 (SP100) (89%aa)	1	P23497							
	nuclear autoantigenic sperm protein (histone-binding) (NASP)	1	M97856	+		+				

5	nuclear corepressor KAP-1 (KAP-1) (=U85040; X97548 TIF1beta zinc finger protein)	1	U78773								
	Nuclear domain 10 protein (NDP52)	4	U22897	+	+	+	+	+	+		
	Nuclear factor (erythroid-derived 2)-like 2 (NFE2L2)	1	S74017		+	+	+	+	+		
10	Nuclear factor of kappa light polypeptide gene enhancer in B-cells 1 (p105) (NFKB1)	2	M58603		+	+		+	+		
	nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor, alpha (NFKBIA)	3	M69043		+	+	+		+		
15	nuclear factor related to kappa B binding protein (NFRKB)	1	U08191		+	+	+		+		
	nuclear mitotic apparatus protein 1 (NUMA1)	3	Z11583	+	+	+	+	+	+		
	nuclear receptor coactivator 2 (GRIP1)	1	X97674								
	nuclear receptor coactivator 3 (AIB3)	2	AF010227	+	+	+			+		
20	nuclear receptor coactivator 4 (ELE1)	22	X77548		+	+	+	+	+		
	nuclear receptor interacting protein 1 (NRIP1)	1	X84373		+		+		+		
	nuclear respiratory factor 1 (NRF1)	1	U02683	B	+	+					
25	nuclear RNA helicase, DEAD variant of DEAD box family (DDXL)	4	U90426	+	+	+	+		+		
	nuclear transcription factor Y, alpha (NFYA)	1	X59711	B							
	nuclear transcription factor, X-box binding 1 (NFX1)	3	U15308		+	+		+			
	nuclear transport factor 2 (placental protein 15) (PP15)	1	X07315	+	+	+	+		+		
30	nucleobindin (=M96824)	1	U31336								
	nucleobindin 1 (NUCB1)	2	M96824	+	+	+	+		+		
	nucleolar phosphoprotein p130 (P130)	1	Z34289		+	+					
	nucleolar protein (KKE/D repeat) (NOP56)	1	Y12085	+	+	+	+		+		
	nucleolar protein (MSP58)	1	AF015308								
35	nucleolar protein 1 (120kD) (NOL1)	1	M32110	+	+						
	nucleolar protein p40	1	U86602	+	+	+	+		+		
	nucleolin (NCL)	2	M60858	+	+	+	+		+		
	nucleophosmin (nucleolar phosphoprotein B23, numatrin) (NPM1)	14	M28699	+	+	+	+		+		
40	nucleophosmin-retinoic acid receptor alpha fusion protein NPM-RAR long form	1	U41742								
	nucleoporin (NUP358) (=D42063 RanBP2 (Ran-binding protein 2))	2	L41840								
	nucleoporin 153kD (NUP153)	1	Z25535								
45	nucleoporin 98kD (NUP98)	1	U41815								
	nucleosome assembly protein	1	U28430								
	nucleosome assembly protein 1-like 1 (NAP1L1)	1	M86667		+	+	+		+		
50	nucleosome assembly protein 1-like 4 (NAP1L4)	2	U77456	+	+	+	+		+		

	nucleosome assembly protein, 5'UTR	1	D28430							
5	olfactory receptor (OR7-141)	1	U86281							
	OLFACTORY RECEPTOR-LIKE PROTEIN HGMP07E (OR17-4) (non-exact 65%)	1	P34982							
	oligodendrocyte myelin glycoprotein (OMG)	7	L05367		+					
10	O-linked N-acetylglucosamine (GlcNAc) transferase (UDP-N-acetylglucosamine:polypeptide-N-acetylglucosaminyl transferase) (OGT)	1	U77413	+	+		+	+	+	
	oncofetal trophoblast glycoprotein ST4 precursor (non-exact 55%)	1	A53531							
15	Oncogene T1M (T1M) (non-exact 84%)	1	U02082							
	ORF (Hs.77888)	1	M68864	+	+	+	+	+	+	
	ORF1; MER37; putative transposase similar to pogo element Length = 454	1	U49973							
20	origin recognition complex, subunit 2 (yeast homolog)-like (ORC2L)	2	U27459				+			
	origin recognition complex, subunit 4 (yeast homolog)-like (ORC4L) (low match)	1	AF022108							
25	ornithine aminotransferase (gyrate atrophy) (OAT)	2	M23204		+	+	+			
	ornithine decarboxylase (ODC)	1	M20372							
	ornithine decarboxylase antizyme, ORF 1 and ORF 2	11	D78361	+	+	+	+	+	+	High in pancreas, and activated T cells
	orphan receptor (Hs.100221)	2	U07132	+	+	+	+		+	
30	OS-9 precursor	6	AB002806	+	+	+	+	+	+	
	osteoneclin (=X82259 BM-40)	1	D28381							
	ovel centrosomal protein RanBPM (RANBPM)	1	AB008515		+	+	+		+	
	over-expressed breast tumor protein	1	C34839							
35	oviductal glycoprotein 1, 120kD (OVGP1)	1	U09550			+	+	+		
	oxidase (cytochrome c) assembly 1-like (OXAIL)	1	X80695		+	+	+	+	+	
	oxoglutarate dehydrogenase (lipoamide) (OGDH)	4	D10523	T	+	+		+	+	
40	oxysterol binding protein (OSBP)	1	M85917	+	+			+		
	OZF	1	X70394		+	+	+		+	
	OZF (non-exact zinc finger)	1	X70394							
	p21/Cdc42/Rac1-activated kinase 1 (yeast Ste20-related) (PAK1)	2	U51120	+	+		+			
45	P35-related protein (= S80990 ficollin)	1	D63392							
	p40	1	U93569							
	p40phox (=U50720)	1	X77094							
	P47 LBC oncogene	4	U03634							
	p53-induced protein (PIG11)	1	AF010315	+	+	+	+			
	p54nrb (low match)	1	Y11287							

p62 nucleoponn	1	X58521							
p63 mRNA for transmembrane protein	1	X69910	+	+	+	+		+	
PAC clone DJ07D1016 from 7q33-q36 (non-exact 54%)	1	Q07108							
palmitoyl-protein thioesterase (ceroid-lipofuscinosis, neuronal 1, infantile; Halls-Santavuori disease) (PPT)	10	U44772		+	+	+		+	
papillary renal cell carcinoma (translocation-associated) (PRCC)	1	X99720	+	+	+	+	+	+	
PAR protein	1	A115850		+		+			
partial EST (clone c-1gh04)	1	Z43627							
PAX3/orkhead transcription factor gene fusion	1	U02368							
paxillin (PXN)	4	D86862		+	+	+		+	
PBK1 protein	2	AJ007398	+	+	+	+		+	
PBS-EST (nz82e01.s1 NCI CGAP GCB1 clone IMAGE:1302936) (low score)	1	AA732534							
PDZ domain protein (Drosophila inad-like) (INALD)	1	AJ224747	+			+		+	
PEBP2aC Runt domain encoding gene (=Z35728)	1	Z38108							
peptidase D (PEPD)	1	J04605							
peptidylprolyl isomerase A (cyclophilin A) (PPIA)	3	Y00052		+	+	+	+	+	high in many libraries
peptidylprolyl isomerase D (cyclophilin D) (PPID)	2	L11667	1	+	+		+	+	
peptidylprolyl isomerase E (cyclophilin E) (PPIE)	1	AF042386		+	+		+	+	
PERB11.1 (=U56942 MHC class I chain-related protein A)	1	U69630							
perforin 1 (preforming protein) (PRF1)	14	M28393							
peroxisomal acyl-CoA thioesterase (PTE1)	2	X88032							
Peroxisomal acyl-coenzyme A oxidase	1	X71440		+	+	+	+	+	
peroxisomal fattyacylated protein (PXF)	1	X75535		+	+	+	+	+	
phorbol-12-myristate-13-acetate-induced protein (PMAIP1)	1	D90070	B, W						
phosphate carrier (mitochondrial gene?)	1	X77337							
Phosphate carrier, mitochondrial (PHC)	3	X60036	+	+	+	+		+	
phosphate cytidyltransferase 1, choline, alpha isoform (PCYT1A)	1	L28957	1		+			+	
PHOSPHATIDATE CYTIDYLTRANSFERASE (CDP-DIGLYCERIDE)	1	Q92903							
phosphatidylinositol 3-kinase delta catalytic subunit	2	U57843							
phosphatidylinositol 4-kinase, catalytic, beta polypeptide (PIK4CB)	3	AB005910	+	+	+	+		+	
phosphatidylinositol glycan, class H (PIGH)	1	L19783		+	+	+	+	+	

5	phosphatidylinositol transfer protein (PI-TPbeta)	2	D30037						
	phosphatidylinositol transfer protein, membrane-associated (PITPNM)	2	X98654	B, T lymphoma	+				
	phosphatidylinositol transfer protein, membrane-associated (PITPNM) (non-exact 64%)	1	X98654						
10	phosphatidylinositol-4-phosphate 5-kinase, type II, alpha (PIP5K2A)	1	U14957		+			+	
	phosphatidylinositol-4-phosphate 5-kinase, type II, beta (PIP5K2B)	1	U85245		+	+	+		+
15	phosphodiesterase 7A (PDE7A)	1	L12052	B, W	+	+		+	
	phosphodiesterase 1B (PDES1B)	1	U56976		ONLY				
	phosphoglucomutase 1 (PGM1)	2	M83088		+	+	+		+
	phosphogluconate dehydrogenase (PGD)	1	U30255			+			
20	phosphoglycerate kinase 1 (PGK1)	12	V00572						
	phosphoglycerate mutase 1 (brain) (PGAM1)	3	J04173	+	+	+	+	+	+
	phosphoglycerate mutase 2 (muscle) (PGAM2)	1	M55673		+	+			+
	phosphoinositide-3-kinase, catalytic, alpha polypeptide (PIK3CA)	1	Z29090		+	+	+		
25	phosphoinositide-3-kinase, catalytic, delta polypeptide (PIK3CD)	4	U86453		+	+	+		+
	phosphoinositide-3-kinase, catalytic, gamma polypeptide (PIK3CG)	1	X83368						
	phospholipase C	1	X14034						
30	phospholipase C, delta 1 (PLCD1)	2	U09117		+	+	+		+
	phospholipase C, gamma 1 (formerly subtype 148) (PLCG1)	1	M34667	+	+	+	+		+
	phospholipid scramblase	1	AF008445						
35	phosphonobosyl pyrophosphate synthetase-associated protein 1 (PRPSAP1)	1	D61391		+	+			+
	phosphonobosylglycinamide formyltransferase, phosphoribosylglycinamide synthetase, phosphoribosylaminoimidazole synthetase (GART)	3	X54199		+	+	+	+	+
40	phosphorylase kinase, alpha 2 (liver), glycogen storage disease IX (PHKA2)	3	D38616		+	+	+	+	+
	phosphorylase, glycogen; brain (PYGB)	1	U47025	+	+	+			+
	phosphorylase, glycogen; brain (PYGB) (low match, non-exact, 75%)	1	U47025						
45	phosphorylase, glycogen; liver (Hers disease, glycogen storage disease type VI) (PYGL)	1	Y15233		+	+	+		+
	phosphorylation regulatory protein HP-10	2							
50	phosphatidylinositol transfer protein (PITPN)	1	D30036	+	+	+	+		+

5	pigment epithelium-derived factor (PEDF)	1	U29953	+	+	+	+	+	+	+	+
	pim-1 oncogene (PIM1)	1	M24779	+	+	+	+	+	+	+	+
	pinin, desmosome associated protein (PNN)	1	U77718	B, monocyte, T lymphoma							
	placenta (Diff33)	5	U49188		+	+	+	+	+	+	+
	placenta (Diff33) (non-exact, 69%)	1	U49188								
10	placenta (Diff48)	18	U49187	+							
	placenta (Diff48) (low match)	1	U49187								
	placenta (Diff48) (low match)	1	U49187								
	plasminogen activator, urokinase receptor (PLAUR)	1	X74039		+		+		+		
15	platelet factor 4 (PF4)	1	M25897			+				+	
	platelet/endothelial cell adhesion molecule (CD31 antigen) (PECAM1)	8	M37780			+	+	+	+	+	+
	platelet-activating factor acetylhydrolase 2 (40kD) (PAFAH2)	4	U89386		+	+	+	+			
20	platelet-activating factor acetylhydrolase, isoform 1b, alpha subunit (45kD) (PAFAH1B1)	1	U72342	+	+	+	+	+	+	+	+
	platelet-activating factor receptor (PTAFR)	1	D10202		+					+	
	pleckstrin (PLEK)	10	X07743			+	+			+	
25	pleckstrin (PLEK) (low match)	1	X07743								
	pleckstrin homology, Sec7 and coiled/coiled domains 1 (cytohesin 1) (PSCD1)	4	M85169	+	+		+			+	
	pleckstrin homology, Sec7 and coiled/coiled domains, binding protein (PSCDBP)	4	L06633	+			+				
	pM5 protein	1	X57398	+	+	+	+			+	
30	PMP89	2	Y14322								
	poly (ADP-ribose) polymerase (NAD (+) ADP-ribosyltransferase) (=X16674)	1	X58140								
	poly(A) polymerase (PAP)	1	X76770	+	+	+	+	+	+	+	+
35	poly(A)-binding protein-like 1 (PABPL1)	19	Y00345	+	+	+	+	+	+	+	+
	poly(RC)-binding protein 1 (PCBP1)	3	X78137	+	+	+	+	+	+	+	+
	polyadenylate binding protein	1	U75886								
	polycystic kidney disease 1 (autosomal dominant) (PKD1)	5	U24498								
40	polymerase (DNA directed), beta (POLB)	1	D29013		+				+	+	
	polymerase (DNA directed), gamma (POLG)	6	D84103								
	polymerase (RNA) II (DNA directed) polypeptide A (220kD) (POLR2A)	1	X63564	+	+	+	+	+	+	+	+
45	polymyositis/scleroderma autoantigen 2 (100kD) (PMSC2)	1	L01457	+	+	+	+	+	+	+	+
	polypyrimidine tract binding protein (heterogeneous nuclear ribonucleoprotein I) (PTB)	1	X65372	+	+	+	+	+	+	+	+

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5	procollagen-proline, 2-oxoglutarate 4-dioxygenase (proline 4-hydroxylase), beta polypeptide (protein disulfide isomerase; thyroid hormone binding protein p55) (P4HB)	4	X05130	+	+	+	+	+	+	+	+
10	prohelin 1 (PFN1)	1	J03191	+	+	+	+	+	+	+	+
	progesterone receptor-associated p48 protein (P48)	2	U28918		+						
	prohibitin (PHB)	1	S85655		+	+	+	+	+	+	+
	proliferating cell nuclear antigen (PCNA)	3	J04718	+	+	+	+				
15	proliferation-associated gene A (natural killer-enhancing factor A) (PAGA)	4	L19184	+	+	+	+	+	+		
	proline-rich protein BstNI subfamily 2 (PRB2) (non-exact, 43%aa)	1	S82936								
	proline-serine-threonine phosphatase interacting protein 1 (PSTPIP1)	1	U94778								
20	prolyl endopeptidase (PREP)	2	X74496		+		+			+	
	prolylcarboxypeptidase (angiotensinase C) (PRCP)	5	L13977		+	+	+	+	+	+	
	promyelocytic leukemia (PML)	1	M80185	+	+	+	+			+	
25	properdin P factor, complement (PFC)	4	X57748	+							
	pro-platelet basic protein (includes platelet basic protein, beta-thromboglobulin, connective tissue-activating peptide III, neutrophil-activating peptide-2) (PPBP)	1	M54995			+	+			+	
30	pro-platelet basic protein (includes platelet basic protein, beta-thromboglobulin, connective tissue-activating peptide III, neutrophil-activating peptide-2) (PPBP)	7	M54995	+		+		+			
35	proprotein convertase subtilisin/kexin type 7 (PCSK7)	4	U40623								
	prosaposin (variant Gaucher disease and variant metachromatic leukodystrophy) (PSAP)	89	D00422	+	+	+	+	+	+	+	
40	prostaglandin-endoperoxide synthase 1 (prostaglandin G/H synthase and cyclooxygenase) (PTGS1)	1	U63846	B	+				+	+	
	prostaglandin-endoperoxide synthase 2 (prostaglandin G/H synthase and cyclooxygenase) (PTGS2)	2	L15326								
45	prostaglandin-endoperoxide synthase-1 (=L08404; U84208) (all promoters)	1	D64088								
50	prostate carcinoma tumor antigen (pcta-1)	2	L78132								

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protease inhibitor 1 (anti-elastase), alpha-1-antitrypsin (PI)	17	K02212		+	+	+	+	+	high in many libraries
protease inhibitor 2 (anti-elastase), monocyte/neutrophil (ELANH2) (low match)	1	M93056				+		+	
proteasome (prosome, macropain) 26S subunit, ATPase, 1 (PSMC1)	3	L02426	B	+	+			+	
proteasome (prosome, macropain) 26S subunit, ATPase, 3 (PSMC3)	1	M34079	+	+	+	+		+	
proteasome (prosome, macropain) 26S subunit, ATPase, 4 (PSMC4)	2	AF020736							
proteasome (prosome, macropain) 26S subunit, ATPase, 5 (PSMC5)	5	L38810	+	+	+	+	+	+	
proteasome (prosome, macropain) 26S subunit, ATPase, 6 (PSMC6)	2	D78275	+	+	+	+		+	
proteasome (prosome, macropain) 26S subunit, non-ATPase, 11 (PSMD11)	1	AF001212	I	+			+		
proteasome (prosome, macropain) 26S subunit, non-ATPase, 2 (PSMD2)	2	D78151		+	+			+	
proteasome (prosome, macropain) 26S subunit, non-ATPase, 5 (PSMD5)	1	S79862	I	+	+			+	
proteasome (prosome, macropain) 26S subunit, non-ATPase, 7 (Mov34 homolog) (PSMD7)	1	D50063		+	+	+		+	high in many libraries
proteasome (prosome, macropain) 26S subunit, on-ATPase, 12 (PSMD12)	1	AB003103		+	+	+		+	
proteasome (prosome, macropain) activator subunit 1 (PA28 alpha) (PSME1)	3	L07633	+	+	+	+		+	
proteasome (prosome, macropain) subunit, alpha type, 3 (PSMA3)	2	D00762		+	+	+		+	
proteasome (prosome, macropain) subunit, alpha type, 5 (PSMA5)	3	X61970	+	+	+	+		+	
proteasome (prosome, macropain) subunit, alpha type, 7 (PSMA7)	3	AF054185		+	+	+	+	+	
proteasome (prosome, macropain) subunit, alpha type, 7 (PSMA7) (low match)	1	AF022815							
proteasome (prosome, macropain) subunit, beta type, 1 (PSMB1)	1	D00761	+	+	+	+	+	+	
proteasome (prosome, macropain) subunit, beta type, 10 (PSMB10)	1	X71874	+	+		+	+	+	
proteasome (prosome, macropain) subunit, beta type, 6 (PSMB6)	1	D29012		+	+	+		+	
proteasome (prosome, macropain) subunit, beta type, 8 (large multifunctional protease 7) (PSMB8)	1	U17497	+	+	+	+		+	
proteasome (prosome, macropain) subunit, beta type, 9 (large multifunctional protease 2) (PSMB9)	3	Z14977	+			+		+	

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5	proteasome (prosome, macropain) subunit, beta type 7 (PSMB7)	1	D38048	+	+	+	+	+	+	
	protective protein for beta-galactosidase (galactosialidosis) (PPGB)	3	M22960	+	+	+	+	+	+	
	protein A alternatively spliced form 2 (A-2)	1	U47925		+					
10	protein activator of the interferon-induced protein kinase (PACT)	1	AF072860		+	+	+		+	high in testis
	protein disulfide isomerase-related protein (P5)	2	D49489	+	+	+	+	+	+	
	protein geranylgeranyltransferase type I, beta subunit (PGGT1B)	1	L25441	+	+	+				
15	protein homologous to chicken B complex protein, guanine nucleotide binding (H12.3)	20	M24194	+	+	+	+	+	+	high in many libraries
	protein kinase A anchoring protein	1	AF037439		+					
	protein kinase C substrate 80K-H (PRKCSH)	2	U50317	+	+	+	+		+	
20	protein kinase C, beta 1 (PRKCB1)	6	X06318	+	+	+	+		+	
	protein kinase C, delta (PRKCD)	1	D10495	+	+	+	+		+	
	protein kinase C, eta (PRKCH)	1	M55284			+			+	
	protein kinase C, mu (PRKCM) (non-exact 78%)	1	X75756							
25	protein kinase C-like 1 (PRKCL1)	2	D26181	+	+	+	+		+	
	protein kinase, AMP-activated, gamma 1 non-catalytic subunit (PRKAG1)	1	U42412		B, T lymphoma	+	+			
	protein kinase, cAMP-dependent, regulatory, type I, alpha (tissue specific extinguisher 1) (PRKAR1A)	4	M18488			+	+	+	+	
30	protein kinase, DNA-activated, catalytic polypeptide (PRKDC)	1	U47077			+	+		+	
	protein kinase, mitogen-activated 1 (MAP kinase 1; p40, p41) (PRKM1)	1	Z11695		B	+			+	
35	protein kinase, mitogen-activated 6 (extracellular signal-regulated kinase, p97) (PRKM6)	1	L77964			+		+	+	
	protein kinase, mitogen-activated, kinase 3 (MAP kinase kinase 3) (PRKMK3)	1	U56839	+		+	+	+	+	
40	protein phosphatase 1, catalytic subunit, alpha isoform (PPP1CA)	5	M63960	+		+	+	+	+	
	protein phosphatase 1, regulatory subunit 10 (PPPR10)	3	Y13247			+	+	+		
	protein phosphatase 1, regulatory subunit 7 (PPP1R7)	2	Z50749	+		+	+	+	+	
45	protein phosphatase 2 (formerly 2A), catalytic subunit, beta isoform (PPP2CB)	1	X12656	+		+	+	+	+	
	protein phosphatase 2 (formerly 2A), regulatory subunit B* (PR 72), alpha isoform and (PR 130), beta isoform (PPP2R3)	1	L07590				+	+		
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5	protein phosphatase 2, regulatory subunit B (B56), alpha isoform (PPP2R5A)	2	L42373	+	+	+	+	+	+	+	
	protein phosphatase 2, regulatory subunit B (B56), delta isoform (PPP2R5D)	3	D78360		+	+	+			+	
	protein phosphatase 2, regulatory subunit B (B56), gamma isoform (PPP2R5C)	1	D26445	+	+	+	+			+	
10	protein phosphatase 2A regulatory subunit alpha-isoform (alpha-PR65)	5	J02902	+	+	+	+			+	
	protein phosphatase 4 (formerly X), catalytic subunit (PPP4C)	2	AF097896	+	+	+	+			+	
	protein tyrosine kinase 2 beta (PTK2B)	4	L49207		+		+			+	
15	protein tyrosine phosphatase epsilon	1	X54134								
	protein tyrosine phosphatase type IVA, member 2 (PTP4A2)	2	L48723	+	+	+	+			+	
	protein tyrosine phosphatase, non-receptor type 1 (PTPN1)	1	M31724	+	+	+	+				
20	protein tyrosine phosphatase, non-receptor type 12 (PTPN12)	1	M93425		+	+	+			+	high in testis
	protein tyrosine phosphatase, non-receptor type 12 (PTPN12) (non-exact, 70%)	1	M93425								
25	protein tyrosine phosphatase, non-receptor type 2 (PTPN2)	2	M25393		+	+	+			+	
	protein tyrosine phosphatase, non-receptor type 4 (megakaryocyte) (PTPN4)	1	M68941			+	+			+	
30	protein tyrosine phosphatase, non-receptor type 6 (PTPN6)	7	M74903	+	+	+	+			+	
	protein tyrosine phosphatase, non-receptor type 7 (PTPN7)	1	D11327	+			+			+	
	protein tyrosine phosphatase, receptor type, alpha polypeptide (PTPRA)	1	M34668	+	+	+	+			+	
35	protein tyrosine phosphatase, receptor type, c polypeptide (PTPRC)	44	Y00638	+	+		+			+	
	protein tyrosine phosphatase, receptor type, M (PTPRM)	1	X58288		+	+	+			+	
40	protein tyrosine phosphatase, receptor type, N polypeptide 2 (PTPRN2)	2	U81561		+		+			+	
	protein with polyglutamine repeat (ERPROT213-21)	1	U94836	+	+	+	+			+	
45	protein-kinase, interferon-inducible double stranded RNA dependent inhibitor (PRKRI)	1	U28424		+	+	+	+	+	+	
	protein-L-aspartate (D-aspartate) O-methyltransferase (PCMT1)	4	D13892		+	+					
	proteoglycan 1, secretory granule (PRG1)	7	J03223		+		+			+	
50	prothymosin, alpha (gene sequence 28) (PTMA)	12	M14483	+	+	+	+	+	+	+	

5	prp28, U5 snRNP 100 kd protein (U5-100K)	7	AF026402	+	+	+	+	+	+	
	PRP4/STKWD splicing factor (HPRP4P)	1	AF001687		+	+	+		+	
	PTK7 protein tyrosine kinase 7 (PTK7)	1	U40271		+	+	+		+	
	purinergic receptor P2X, ligand-gated ion channel, 4 (P2RX4)	3	AF000234		+	+	+		+	
10	purinergic receptor P2X, ligand-gated ion channel, 7 (P2RX7)	1	Y12851	+						macrophage only
	puromycin-sensitive aminopeptidase (PSA)	1	Y07701		+	+			+	
	putative ATP(GTP)-binding protein	2	AJ010842		+				+	
15	putative brain nuclearly-targeted protein (KIAA0765)	1	AB018308	+	+	+	+		+	
	putative chemokine receptor, GTP-binding protein (HM74)	1	D10923	+						
	putative diacyl-CoA isomerase (ECH1)	1	AF030249							
	putative G-binding protein	1	AF065393							
20	Putative human HLA class II associated protein I (PHAP1)	1	U73477	B	+				+	
	Putative L-type neutral amino acid transporter (KIAA0436)	1	AB007896							
	putative mitochondrial space protein 32.1	1	AF050198							
25	POTATIVE MUCIN CORE PROTEIN PRECURSOR 24 (MULTI-GLYCOSYLATED CORE PROTEIN 24) (MGC-24) (MUC-24)	1	Q04900							
	putative nucleic acid binding protein	2	X76302	+	+	+	+		+	
30	putative outer mitochondrial membrane 34 kDa translocase Htom34	1	U58970		+	+	+		+	
	putative p150 (non-exact 88%)	1	U93568							
35	putative translation initiation factor (SUI1)	1	L26247	+	+	+	+	+	+	High in moderately differentiated colon adenocarcinoma
	putative tumor suppressor protein (123F2)	1	AF061836		+	+	+		+	
	pyroline 5-carboxylate reductase	1	M77836	+	+	+	+		+	
	pyruvate dehydrogenase (lipoamide) alpha 1 (PDHA1)	1	D90084		+	+	+	+	+	
40	pyruvate dehydrogenase (lipoamide) beta (PDHB)	2	J03576	+	+	+	+		+	
	Pyruvate dehydrogenase complex, lipoyl-containing component X; E3-binding protein (PDX1)	3	Y13145		+	+				
	pyruvate kinase, muscle (PKM2)	11	M23725						+	
45	RAB, member of RAS oncogene family-like (RABL)	1	U18420		+	+	+		+	
	RAB1, member RAS oncogene family (RAB1)	3	M28209		+	+	+		+	
	RAB11A, member RAS oncogene family (RAB11A)	2	X56740	+	+	+	+		+	high in spleen

5	RAB11B, member RAS oncogene family (Rab11B)	1	D45418		+					+	
	RAB27A, member RAS oncogene family (RAB27A)	3	U38654					+			
	RAB5B, member RAS oncogene family (RAB5B)	1	X54871		+	+	+			+	
	RAB6, member RAS oncogene family (RAB6)	1	M28212		+					+	
10	RAB7, member RAS oncogene family (RAB7)	1	X93499	+	+	+	+			+	
	RAB7, member RAS oncogene family-like 1 (RAB7L1)	2	D84488		+	+	+			+	
	RAB9, member RAS oncogene family (RAB9)	1	U44103								
15	RAD50 (S. cerevisiae) homolog (RAD50)	2	U63139		+	+	+				
	RAD51 (S. cerevisiae) homolog C (RAD51C)	1	AF029669		+	+	+			+	
	Radin blood group (RD)	2	L03411		+	+	+			+	
	RAE1 (RNA export 1, S.pombe) homolog (RAE1)	3	U84720	+	+	+	+			+	
	ralA-binding protein (RLIP78)	2	L42542	+	+	+	+				
20	RAN binding protein 2-like 1 (RANBP2L1)	2	AF012086								
	Ran GTPase activating protein 1 (RANGAP1)	3	X82260	+	+	+	+			+	
	RAN, member RAS oncogene family (RAN) (low match)	1	M31469								
25	RanBP2 (Ran-binding protein 2) (=U19248; L41840 sapiens nucleoporin (NUP358))	1	D42083								
	transforming growth factor, beta receptor II (70-80kD) (TGFB2)	4	D50683	+	+	+	+			+	
	RAP1A, member of RAS oncogene family (RAP1A)	10	M22995	+	+	+	+	+	+	+	
30	RAR-related orphan receptor C (RORC)	1	U16997							+	
	RAS guanyl releasing protein 2 (calcium and DAG-regulated)	1	Y12336	+	+						
	ras homolog gene family, member A (ARHA)	12	X05028	+	+	+	+	+	+	+	high in ovary
35	ras homolog gene family, member G (rho G) (ARHG)	1	X61587	+	+	+	+				
	ras homolog gene family, member H (ARHH)	2	Z35227	+	+	+				+	
	ras inhibitor (RIN1)	2	M37191		+						
	Ras-GTPase activating protein SH3 domain-binding protein 2 (KIAA0860)	2	AF053535	+	+	+	+			+	
40	Ras-GTPase-activating protein SH3-domain-binding protein (G3BP)	3	U32519	+	+	+	+			+	
	ras-related C3 botulinum toxin substrate 2 (rho family, small GTP binding protein Rac2) (RAC2)	11	M29871			+				+	
45	RAS-RELATED PROTEIN RAP-1B (GTP-BINDING PROTEIN SMG P21B)	1	P09526								
	RBQ-1	1	X85133		+	+	+				
	rearranged T cell receptor beta variable region (TCRB) (=X58810)	1	L06891								
50	regulator of Fas-induced apoptosis (TOSO)	1	AF057557	B						+	

5	regulator of G protein signalling 6 (RGS6)	1	AF073920		+					
	regulator of G-protein signalling 14 (RGS14)	2	AF037195		+	+	+	+		
	regulator of G-protein signalling 2, 24kD (RGS2)	6	L13391		+	+	+	+	+	
	regulator of G-protein signalling 5 (RGS5) (49% aa)	1	O15539							
10	regulatory factor X, 4 (influences HLA class II expression) (RFX4)	1	M69297				+	+		
	regulatory factor X, 5 (influences HLA class II expression) (RFX5)	2	X85786	I		+	+		+	
	replication protein A1 (RPA1)	1	M63488		+	+	+	+		+
15	replication protein A3 (14kD) (RPA3) (low match)	1	L07493							
	reproduction B (DBS2Z98E)	1	D83787				+	+	+	
	requiem, apoptosis response zinc finger gene (REQ)	2	U94585		+	+	+	+		+
	requiem, apoptosis response zinc finger gene (REQ) (=AF001433) (low match)	1	U94585							
20	restin (Reed-Steinberg cell-expressed intermediate filament-associated protein) (RSN)	1	M97501	B, I		+	+			
	retinoblastoma 1 (including osteosarcoma) (RB1)	3	L11910		+	+	+	+		
25	retinoblastoma binding protein 2 homolog 1 (RBBP2H1)	1	AF087481							
	retinoblastoma-binding protein 1 (RBBP1)	1	S68427		+	+				
	retinoblastoma-binding protein 2 (RBBP2)	5	S68431		+	+	+	+		+
30	retinoblastoma-binding protein 4 (RBBP4)	1	X71810			+	+	+		+
	retinoblastoma-binding protein 4 (RBBP4)	1	X74262			+	+	+		+
	retinoblastoma-binding protein 7 (RBBP7)	1	U35143							
	retinoblastoma-like 2 (p130) (RBL2)	1	X76061			+	+	+		+
35	retinoic acid receptor responder (tazarotene induced) 3 (RARRES3)	1	AF060228			+		+	+	+
	retinoic acid receptor, alpha (RARA)	1	X06538		+	+		+		
	retinoic acid responsive (NN8-4AG)	1	U50383			+		+		+
40	retinoid X receptor beta (RXR-beta)	2	X66424			+	+	+		+
	REV3 (yeast homolog)-like, catalytic subunit of DNA polymerase zeta (REV3L)	1	AF035537							
	Rho GDP dissociation inhibitor (GDI) beta (ARHGDIb)	23	L07916		+	+	+	+	+	+
	Rho GTPase activating protein 4 (ARHGAP4)	2	X78817		+	+				
45	Rho GTPase activating protein 4 (ARHGAP4) (low match)	1	P98171							
	Rho-associated, coiled-coil containing protein kinase 2 (ROCK2)	1	AB014519							
50	ribonuclease 6 precursor (RNASE6PL)	2	U85625		+	+	+	+	+	+

	ribonuclease 6 precursor (RNASE6PL) (low match)	1	U85625									
5	ribonuclease, RNase A family, 2 (liver, eosinophil-derived neurotoxin) (RNASE2)	1	X55988						*			
	ribonuclease/angiogenin inhibitor (RNH)	3	M36717	+	+	+	+			+		
10	ribonucleoside diphosphate reductase M1 subunit	1	X65708									
	ribonucleotide reductase M2 polypeptide (non-exact 91%)	1	P31350									
	ribophorin I (RPN1)	1	Y00281	+	+	+	+				+	
	ribophorin II (RPN2)	1	Y00282	+	+	+	+	+	+	+		
15	ribosomal 18S rRNA	3	M10098									
	ribosomal 28S RNA	1	M11167									
	ribosomal phosphoprotein P0, 5'UTR (low match)	1	D28418									
	Ribosomal protein	1										
	ribosomal protein L10 (RPL10)	30	L25899	+	+	+	+	+	+			high in many libraries
20	RIBOSOMAL PROTEIN L10A (CSA-19)	2	P53025									
	ribosomal protein L11 (RPL11)	4	X79234	+	+	+	+	+	+			Alveolar rhabdomyosarcoma
	ribosomal protein L12 (RPL19)	2	L06505	+	+	+	+	+	+			
	ribosomal protein L13 (PRL13)	1	P26373	+	+	+	+	+	+			high in many libraries
25	ribosomal protein L14 (RPL14)	4	D87735	+	+	+	+	+	+			high in many libraries
	ribosomal protein L17 (RPL17)	4	X53777	+								blood only
	ribosomal protein L18 (RPL18)	10	L11568	+	+	+	+			+		
	ribosomal protein L18a (RPL18A)	5	L05093	+	+	+	+	+	+			High in fetal adrenal gland and skin
30	ribosomal protein L18a homologue	2	X80821				+					
	ribosomal protein L19 (RPL19)	15	X63527	+	+	+	+	+	+			
	ribosomal protein L21 (RPL21)	6	U14967	+	+	+	+	+	+			
	ribosomal protein L22 (RPL22)	3	D17652	+	+	+	+			+		
35	ribosomal protein L23 (RPL23)	2	X55954	+	+	+	+	+	+			high in many libraries
	ribosomal protein L23a (RPL23A)	5	U37230	+	+	+	+	+	+			high in many libraries
	ribosomal protein L26 (RPL26)	8	X69392	+	+	+	+	+	+			
	ribosomal protein L27 (RPL27)	6	L05094	+	+	+	+			+		
40	ribosomal protein L27a (RPL27A)	10	U14968	+	+	+	+	+	+			
	ribosomal protein L28 (RPL28)	6	U14969	+	+	+	+			+		
	ribosomal protein L29 (RPL29)	6	U10248	+	+	+	+	+	+			
	ribosomal protein L3 (RPL3)	81		+	+	+	+	+	+			high in many libraries
45	ribosomal protein L3 homologue	81	X06323									
	ribosomal protein L30 (RPL30)	6	X79238	+	+	+		+	+	+		high in lymphoma
	ribosomal protein L30 (RPL30) (low score)	1	X79238									
	ribosomal protein L31 (RPL31)	10	X15940	+	+	+	+	+	+			High in alveolar rhabdomyosarcoma

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ribosomal protein L32 (RPL32)	3	X03342	+	+	+	+	+	+	+	
ribosomal protein L33-like (RPL33L)	1	AF047440		+	+	+	+	+	+	
ribosomal protein L34 (RPL34)	5	L38941		+	+	+	+	+	+	
ribosomal protein L34 (RPL34) (low match)	1	L38941								
ribosomal protein L37 (RPL37)	5	D23681	+	+	+	+	+	+	+	high in barstead prostate
ribosomal protein L37a	4	X66699	+	+	+	+	+	+	+	high in many libraries
ribosomal protein L38 (RPL38)	1	Z26876	+	+	+	+	+	+	+	high in many libraries
ribosomal protein L4 (RPL4)	27	D23660	+	+	+	+	+	+	+	high in many libraries
ribosomal protein L41 (RPL41)	4	AF026844	+	+	+	+	+	+	+	high in many libraries
ribosomal protein L5 (RPL5)	14	U14968	+	+	+	+	+	+	+	High in alveolar rhabdomyosarcoma
ribosomal protein L5 (RPL5) (low match)	1	U14968								
ribosomal protein L6 (RPL6)	7	X69391	+	+	+	+	+	+	+	high in many libraries
ribosomal protein L7 (RPL7)	14	X52987	+	+	+	+	+	+	+	high in conorm
ribosomal protein L7a (RPL7A)	15	M38072	+	+	+	+	+	+	+	High in uterus, and seminoma
ribosomal protein L8 (RPL8)	5	Z28407	+	+	+	+	+	+	+	high in ovary
ribosomal protein L9 (RPL9)	10	U09953		+	+	+	+	+	+	
ribosomal protein S10 (RPS10)	5	U14972	+	+	+	+	+	+	+	high in many libraries
ribosomal protein S11 (RPS11)	4	X06617	+	+	+	+	+	+	+	high in many libraries
ribosomal protein S11 (RPS11) (low match)	1	AB007152								
ribosomal protein S12 (RPS12)	3	X53505	+	+	+	+	+	+	+	high in many libraries
ribosomal protein S13 (RPS13)	2	L01124		+	+	+	+	+	+	
ribosomal protein S14 (RPS14)	12	M13934	+	+	+	+	+	+	+	
ribosomal protein S15 (RPS15)	2	M32405	+	+	+	+	+	+	+	
ribosomal protein S16 (RPS16)	3	M60854	+	+	+	+	+	+	+	High in prostate invasive tumor
ribosomal protein S17 (RPS17)	2	M13932	+	+	+	+	+	+	+	high in many libraries
ribosomal protein S18	8	X69150								
ribosomal protein S19 (RPS19)	7	M81757	+	+	+	+	+	+	+	high in many libraries
ribosomal protein S2 (RPS2)	4	X17206	+	+	+	+	+	+	+	high in many libraries
RIBOSOMAL PROTEIN S2 (RPS4)	2	P15880								
ribosomal protein S20 (RPS20)	7	L06498	+	+	+	+	+	+	+	high in many libraries
ribosomal protein S21 (RPS21)	3	L04483	+	+	+	+	+	+	+	high in CD34+/CD38- hematopoietic cells and skin tumor
ribosomal protein S23 (RPS23)	3	D14530		+	+	+	+	+	+	
ribosomal protein S24 (RPS24)	7	M31520	+	+	+	+	+	+	+	high in uterus
ribosomal protein S25 (RPS25)	3	M64716	+	+	+	+	+	+	+	high in barstead prostate
ribosomal protein S26 (RPS26)	2	X69854		+	+	+	+	+	+	
ribosomal protein S27 ((metalloproteinase 1) (RPS27))	5	U57847	+	+	+	+	+	+	+	

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5	ribosomal protein S28 (RPS28)	3	U58682	+	+	+	+	+	+	
	ribosomal protein S29 (RPS29)	2	U14973	+	+	+	+	+	+	
	ribosomal protein S3 (RPS3)	9	X55715	+	+	+	+	+	+	high in many libraries
	ribosomal protein S3 (RPS3) (low match)	1	U14990							
10	ribosomal protein S3A (RPS3A)	21	Z83334		+	+	+	+	+	high in many libraries
	ribosomal protein S3A (RPS3A) (low score)	1	M77234							
	ribosomal protein S4, X-linked (RPS4X)	9	M58458	+	+	+	+		+	high in ovary and Synovial sarcoma
	ribosomal protein S4, Y-linked (RPS4Y)	2	M58459	+	+	+	+	+	+	
15	ribosomal protein S5 (RPS5)	4	U14970	+	+	+	+	+	+	high in lymphoma
	RIBOSOMAL PROTEIN S6 (PHOSPHOPROTEIN NP33)	1	P10660							
	ribosomal protein S6 (RPS6)	22	M20020	+	+	+	+	+	+	
	ribosomal protein S6 (RPS6) (non-exact 88%)	1	M77232							
20	ribosomal protein S6 kinase, 90kD, polypeptide 1 (RPS6KA1)	3	L07597	+	+	+	+		+	
	ribosomal protein S6 kinase, 90kD, polypeptide 2 (RPS6KA2)	1	X85106							
	ribosomal protein S7 (RPS7)	4	Z25749		+	+	+	+	+	
25	ribosomal protein S8 (RPS8)	6	X67247		+	+	+	+	+	
	ribosomal protein S9 (RPS9)	8	U14971							colon tumor
	ribosomal protein, large, P0 (RPLP0)	18	M17885	+		+			+	
	ribosomal protein, large, P1 (RPLP1)	12	M17886	+	+	+		+		
30	ribosomal RNA 18S (=M10098; K03432) (=polyadenylating sequence)	11	X03205							
	ribosomal RNA 28S	2	M11167							
	ribosomal RNA, 16S	1	U25123							
35	rng finger protein (non-exact 58%)	1	AJ001019							
	rng finger protein 3 (RNF3)	1	AJ001019							
	rng finger protein 4 (RNF4)	3	AB000468		+	+	+		+	
	ring zinc-finger protein (ZNF127-Xp)	3	U41315		+	+	+		+	
	RNA (guanine-7-) methyltransferase (RNMT)	1	AB007858		+	+	+		+	
40	RNA binding motif protein 5 (RBMS)	4	U23946	+	+	+	+		+	
	RNA binding motif, single stranded interacting protein 2 (RBMS2)	1	D28483		+		+		+	
	RNA helicase (putative), (Myc-regulated DEAD box protein) (MRD8)	1	X98743	+	+	+	+		+	
45	RNA helicase-related protein	1	AF083255		+	+	+		+	
	RNA pol II largest subunit	2	X74872							
	RNA polymerase I subunit (RPA40)	1	AF008442		+	+			+	
	RTVP-1 protein	2	X91911	+	+	+	+		+	

5	S100 calcium-binding protein A10 (annexin II ligand, calpactin I, light polypeptide (p11)) (S100A10)	2	M81457			+		+	+	
	S100 calcium-binding protein A11 (calgizzarin) (S100A11)	1	X80201		+	+	+		+	
10	S100 calcium-binding protein A4 (calcium protein, calvasculin, metastasin, murine placental homolog) (S100A4)	3	M80563	B		+		+		
	S100 calcium-binding protein A8 (calgranulin A) (S100A8)	7	M21005			+	+		+	high in bone marrow
15	S100 calcium-binding protein A9 (calgranulin B) (S100A9)	14	X06233			+	+			high in invasive larynx squamous cell carcinoma
	ST64 gene	1	AF109907							
	S-adenosylmethionine decarboxylase 1 (AMD1)	3	M88003	+	+	+	+		+	
	SB class II histocompatibility antigen alpha-chain	5	M27487	+	+	+	+		+	
20	SC35-interacting protein 1 (SRRP129)	5	AF030234	+	+	+	+	+	+	
	scaffold attachment factor B (SAFB)	1	U72355	+	+	+	+		+	
	scaffold attachment factor B (SAFB) (non-exact 78%)	1	U72355							
25	scrRNA molecule, transcribed from Alu repeat	1	L13713							
	SEC14 (S. cerevisiae)-like (SEC14L)	4	D67028		+	+	+		+	
	SEC23-like protein B (SEC23B)	2	X97065	+	+	+	+		+	
	SEC63 (SEC63)	1	AF100141		+	+			+	
30	secreted protein, acidic, cysteine-rich (osteonectin) (SPARC)	7	M25746		+	+	+	+	+	high in bone marrow stroma
	secretory carrier membrane protein 1 (SCAMP1)	1	AF038966		+		+			
	secretory carrier membrane protein 2 (SCAMP2)	1	AF005038	+	+	+	+	+	+	
35	secretory carrier membrane protein 3 (SCAMP3)	1	AF005039							
	secretory granule proteoglycan core (clones lambda-PG[6,7,8])	1	M33649							
	selectin L (lymphocyte adhesion molecule 1) (SELL)	43	X17519	+			+		+	
40	selectin P ligand (SELPLG)	13	U02297	+	+					
	sema domain, immunoglobulin domain (Ig), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 4D (SEMA4D)	2	U60800		+		+		+	
45	Ser/Arg-related nuclear matrix protein (plenty of prolines 101-like) (SRM160)	4	AF048977		+	+	+	+	+	
	serine palmitoyltransferase subunit I (SPTI)	1	Y08685		+	+	+		+	
50	serine palmitoyltransferase, subunit II (LCB2)	1	AB011098	+	+	+	+		+	

5	serine protease	1	J02907							
	serine protease inhibitor, Kunitz type, 2 (SPINT2)	1	U78095	+	+	+	+	+	+	
	serine/threonine kinase 10 (STK10)	1	AB015718	+	+	+	+	+	+	
	serine/threonine kinase 19 (STK19)	1	L26260	+	+	+	+	+	+	
	serine/threonine kinase 4 (STK4)	1	U18297		+					+
10	serine/threonine protein kinase KKIALRE (KKIALRE)	1	X68358		+	+	+	+	+	
	serine/threonine protein-kinase (NIK)	1	Y10256		+	+	+			
	SERINE/THREONINE-PROTEIN KINASE RECEPTOR R3 PRECURSOR (SKR3)	1	P37023							
15	serologically defined colon cancer antigen 18 (NY-CO-18)	2	AF039694							
	serologically defined colon cancer antigen 33 (SDCCAG33)	1	AF039698	B, I	+	+		+		
20	serologically defined colon cancer antigen 33 (SDCCAG33) (low score)	1	AF039698							
	serologically defined colon cancer antigen 33 (SDCCAG33) (low score)	1	AF039698							
	serum deprivation response (phosphatidylserine-binding protein) (SDPR) (=S67386)	1	AF085481.1							
25	serum/glucocorticoid regulated kinase (SGK)	2	Y10032	+	+	+	+	+	+	
	SET domain, bifurcated 1 (SETDB1)	2	D31891	+	+	+			+	
	SH2 domain protein 1A, Duncan's disease lymphoproliferative syndrome) (SH2D1A)	1	AF073019	I					+	
30	SH3 binding protein (SAB)	2	AB005047	+	+	+	+	+	+	
	SH3 domain protein 1B (SH3D1B)	4	U61167	+			+		+	
	SH3BGR PROTEIN (=21-GLUTAMIC ACID-RICH PROTEIN;21-GARP) (non-exact 82%aa)	1	P55822							
35	SH3-binding domain glutamic acid-rich protein like (SH3BGR)	1	AF042081	+	+	+	+	+	+	
	SH3-domain GRB2-like 1 (SH3GL1)	1	U65999	+	+	+	+	+	+	
	SHC (Src homology 2 domain-containing) transforming protein 1 (SHC1)	2	X68148		+	+	+	+	+	
40	shah binding protein 1 (ShahBP1)	2	U51588		+	+	+		+	
	shah binding protein 1 (ShahBP1) (non-exact, 69%)	1	U51588							
	Sialomucin CD164 (CD184)	9	D14043							
45	sialophorin (gpL115, leukosialin, CD43) (SNP)	2	J04536							
	sialyltransferase (STHM)	1	U14550			+	+	+	+	
	sialyltransferase 1 (beta-galactoside alpha-2,6-sialyltransferase) (SIAT1)	2	X17247	+	+	+	+	+	+	

5	sialytransferase 4A (beta-galactosidase alpha-2,3-sialyltransferase) (SIAT4A)	1	AF059321	B	+	+		+	+	
	sialytransferase 8 (alpha-2, 8-polysialyltransferase) D (SIAT8D)	1	L41680		+					
	signal peptidase 25kDa subunit	1	L38950							
10	signal recognition particle 14kD (homologous Alu RNA-binding protein) (SRP14)	1	X73459	+	+	+	+	+	+	
	signal recognition particle 54kD (SRP54)	1	U51920			+	+		+	
	signal recognition particle 9kD (SRP9)	2	U20998		+	+	+	+	+	
15	signal recognition particle receptor ('docking protein') SRPR	5	X06272							
	signal regulatory protein, beta, 1 (SIRP-BETA-1)	5	Y10376		+				+	
	signal sequence receptor, alpha (translocon-associated protein alpha) (SSR1)	2	Z12830				+		+	
20	signal sequence receptor, beta (translocon-associated protein beta) (SSR2)	2	X74104	+	+	+	+		+	
	signal transducer and activator of transcription (STAT5A)	4	L41142	+	+	+	+	+	+	
25	signal transducer and activator of transcription 2, 113kD (STAT2)	1	U18671						+	
	signal transducer and activator of transcription 3 (acute-phase response factor) (STAT3)	3	L29277							
	signal transducer and activator of transcription 5A (STAT5A)	2	U48730	+	+	+	+	+	+	
30	signal transducing adaptor molecule (SH3 domain and ITAM motif) 1 (STAM)	1	U43899							
	silencing mediator of retinoid and thyroid hormone action (SMRT)	1	U37148							
35	similar to beta-transducin superfamily proteins (SAZD)	1	U02809	+	+	+			+	
	similar to S. cerevisiae SSM4 (TEB4)	1	AB011169		+	+	+		+	
	similar to yeast pre-mRNA splicing factors, Prp1/Zer1 and Prp6	1	AF026031	+	+	+	+		+	
40	STI protein	1	AJ010059.1							
	Sjogren syndrome antigen A1 (52kD, ribonucleoprotein autoantigen SS-A/Ro) (SSA1)	2	M62800					+		
45	Sjogren syndrome antigen A1 (52kD, ribonucleoprotein autoantigen SS-A/Ro) (SSA1) (non-exact 63%) (match to zinc finger)	1	M62800							
	SKAP55 homologue (SKAP-HOM)	1	AJ004888		+	+	+		+	
50	skb1 (S. pombe) homolog (SKB1)	2	AF015913	+	+	+	+		+	

5	skeletal muscle abundant protein	1	X87613	+	+	+	+	+	+	
	SMA3 (SMA3)	1	X83300	+	+	+	+	+	+	
	small acidic protein	3	U51678	+	+	+	+	+	+	
	small EDRK-rich factor 2 (SERF2)	2	Y10351	+	+	+	+	+	+	high in fetal lung
	small inducible cytokine A5 (RANTES) (SCYA5)	2	M21121	+	+	+	+	+	+	high in many libraries
10	small inducible cytokine subfamily C, member 2 (SCYC2)	1	D63789							
	small nuclear ribonucleoprotein polypeptide B* (SNRPB2)	2	M15841		+	+	+		+	
	small nuclear ribonucleoprotein polypeptide N (SNRPN)	4	J04615	+	+	+	+	+	+	
15	small nuclear ribonucleoprotein polypeptides B and B1 (SNRPB)	2	J04564	+	+	+	+		+	
	small nuclear RNA activating complex, polypeptide 5, 19kD (SNAPC5)	1	AF093593	+	+	+	+		+	
20	smallest subunit of ubiquinol-cytochrome c reductase	1	D55636	+	+	+	+	+	+	high in fetal lung
	SMC (mouse) homolog, X chromosome (SMCX)	1	L25270	+	+	+	+		+	
	SMT3B protein (Z)	2	X99585	+	+	+	+	+	+	
25	SNARE protein (YK16) (low match)	1	U95735							
	SNC1B	1	U20428							
	SNC73 protein (SNC73)	2	J00220	+	+		+	+	+	high in many libraries
	solute carrier family 1 (neutral amino acid transporter), member 5 (SLC1A5)	2	U53347		+		+		+	
30	solute carrier family 11 (proton-coupled divalent metal ion transporters), member 1 (SLC11A1)	7	D50403	+						
	solute carrier family 17 (sodium phosphate), member 3 (SLC17A3)	1	U80545				+			
35	solute carrier family 19 (folate transporter), member 1 (SLC19A1)	1	U17568		B, lymphoma	+			+	
	solute carrier family 2 (facilitated glucose transporter), member 1 (SLC2A1)	1	R03195	+	+	+	+	+	+	
	solute carrier family 23 (nucleobase transporters), member 2 (SLC23A2)	3	D87075		+	+	+		+	
40	solute carrier family 25 (mitochondrial carrier, oxoglutarate carrier), member 11 (SLC25A11)	1	AF070548		B, T	+	+		+	+
	solute carrier family 31 (copper transporters), member 2 (SLC31A2)	3	U83481			+		+		
45	solute carrier family 4, anion exchanger, member 2 (erythrocyte membrane protein band 3-like 1) (SLC4A2)	1	X62137			+	+		+	
	solute carrier family 4, sodium bicarbonate cotransporter, member 8 (SLC4A8)	1	AB018282			+				

5	solute carrier family 7 (cationic amino acid transporter, y+ system), member 5 (SLC7A5)	2	M80244	T, W	+	+		+			
	solute carrier family 7 (cationic amino acid transporter, y+ system), member 8 (SLC7A6)	3	D87432	+	+	+				+	
10	solute carrier family 7 (cationic amino acid transporter, y+ system), member 8 (SLC7A6) (non- exact 77%)	1	D87432								
	solute carrier family 9 (sodium/hydrogen exchanger), isoform 6 (SLC9A6)	1	AF030409		+	+	+			+	
15	somatic cytochrome c (HCS)	2	M22877								
	SON DNA binding protein (SON)	2	X63753		+	+	+			+	
	son of sevenless (Drosophila) homolog 1 (SOS1)	1	L13858	+	+		+				
20	sorcin (SRI)	1	M32886								
	sortilin 1 (SORT1)	2	X98248		+		+			+	
	sortilin-related receptor, L(DLR class) A repeats- containing (SORL1)	6	Y08110								
	sorting nexin 1 (SNX1)	3	U53225	+	+	+	+			+	
	sorting nexin 2 (SNX2)	2	AF043453								
25	sorting nexin 6 (SNX6) (=U83194.1 TRAF4- associated factor 2)	1	AF121856.1								
	Sp3 transcription factor (SP3)	1	X68560	+	+	+	+			+	
	Sp3 transcription factor (SP3)	4	M97191	+	+	+	+			+	
30	special A1-rich sequence binding protein 1 (binds to nuclear matrix/scaffold- associating DNA's) (SATB1)	1	M97287								
	speckle-type POZ protein (SPOP)	4	AJ000644								
	speckle-type POZ protein (SPOP) (non-exact)	1	AJ000644								
35	spectrin SH3 domain binding protein 1 (SSH3BP1)	6	D87166	+	+	+	+				
	Spectrin, alpha, non- erythrocytic 1 (alpha-fodrin) (SPTAN1)	2	J05243		+	+				+	
	spermidine/spermine N1- acetyltransferase (SAT)	11	M55580								
40	spermidine/spermine N1- acetyltransferase (SAT) (non-exact, 84%)	1	U40369								
	spermine synthase (SMS)	1	AD001528	+	+	+	+			+	
	SPF31 (SPF31)	1	AF083190	+	+	+	+			+	
	sphingomyelin phosphodiesterase 1, acid lysosomal (acid sphingomyelinase) (SMPD1)	1	X52679		+	+				+	
45	SPINDLIN HOMOLOG (PROTEIN DXF34)	1	Q99865								
	spinocerebellar ataxia 1 (olivopontocerebellar ataxia 1, autosomal dominant, ataxin 1) (SCA1)	3	X79204	B	+					+	

5	spinocerebellar ataxia 2 (olivopontocerebellar ataxia 2, autosomal dominant, ataxin 2) (SCA2)	1	U70323	B					+			
	spinocerebellar ataxia 7 (olivopontocerebellar atrophy with retinal degeneration) (SCA7)	2	AJ000517			+						
10	spliceosome associated protein (SAP 145)	3	U41371			+	+	+	+	+		
	splicing factor (CC1.3) (CC1.3)	2	L10910	+		+	+	+	+	+		
	splicing factor SRp40-1 (SRp40)	7	U30826	+		+	+	+	+	+		
	splicing factor, arginine/serine-rich 11 (SFRS11)	3	M74002	B		+	+		+	+		
15	splicing factor, arginine/serine-rich 7 (35kD) (SFRS7)	4	L41887			+	+	+		+		
	Src-like adapter protein (non-exact, 76%aa)	1	U30473									
	Src-like adapter (SLA)	8	D89077			+	+	+		+		
	Src-like adapter (SLA) (low match)	1	D89077									
20	Src-like adapter (SLA) (low score)	1	U44403									
	stannin (SNN)	2	AF030196	+		+	+	+		+		
	STAT induced STAT inhibitor 3 (SSI-3)	1	AB004904					+				
	STE20-like kinase 3 (MST-3)	2	AF024636	+		+	+	+		+		
25	step II splicing factor SLU7 (SLU7)	1	AF101074			+		+	+	+		
	steroid sulfatase	1	M17591									
	steroid sulfatase (microsomal), arylsulfatase C, isozyme S (STS)	1	J04964			+	+	+				
	sterol carrier protein 2 (SCP2)	1	M55421			+	+	+	+	+		
30	sterol O-acyltransferase (acyl-Coenzyme A: cholesterol acyltransferase) 1 (SOAT1)	1	AF059202						+			
	stimulated trans-acting factor (50 kDa) (STAF50)	6	X82200	+		+		+				
	Striatin, calmodulin-binding protein (STRN) (low match, 71%aa)	1	U17989									
35	Stromal antigen 2 (STAG2)	2	Z75331					+	+	+	+	
	stromal interaction molecule 1 (STIM1)	3	U52426	+		+	+	+	+	+		
	structure specific recognition protein 1 (SSRP1)	1	M86737			+	+	+		+		
40	succinate dehydrogenase complex, subunit A, flavoprotein (Fp) (SDHA)	5	L21936				+					
	succinate dehydrogenase complex, subunit B, iron sulfur (lp) (SDHB)	1	U17248	+		+	+	+		+		
	succinate dehydrogenase complex, subunit C, integral membrane protein, 15kD (SDHC)	1	U57877	+		+	+	+		+		
45	succinate dehydrogenase complex, subunit D, integral membrane protein (SDHD)	3	AB006202			+	+		+			
	succinate-CoA ligase, GDP-forming, beta subunit (SUCLG2)	1	AF058954			+	+	+	+	+		
50												

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5	synovial sarcoma, translocated to X chromosome (SSXT)	2	X79201		+					
	syntaxin 1b	1	AF038897							
	syntaxin 3A (STX3A)	2	U32315		+		+		+	
	syntaxin 6 (STX6)	1	AJ002078.1							
10	SYNTAXIN BINDING PROTEIN 3 (UNC-18 HOMOLOG 3) (UNC-18C)	1	O00186							
	syntaxin-18C	1	AF008937							
	SYT interacting protein (SIP)	1	AF080561		+	+	+		+	
	T cell activation, increased late expression (TACTILE)	4	M88262				+			
15	T cell receptor V alpha gene segment V-alpha-7 (clone IGRa11)	2	X58744							
	T cell receptor V alpha gene segment V-alpha-w27	1	X58740							
	T3 receptor-associated cofactor-1	5	S83390	+	+	+	+	+	+	
20	tafazzin (cardiomyopathy, dilated 3A (X-linked); endocardial fibroelastosis 2; Barth syndrome) (TAZ)	1	X92763	+	+		+		+	
	TAFII100 protein (non-exact 53%)	1	U80191							
	tankyrase, TRF1-interacting ankyrin-related ADP-ribose polymerase (TNKS)	1	AF082556		+	+	+		+	
25	TAP1, TAP2, LMP2, LMP7 and DOB	1	X66401							
	TAR DNA-binding protein-43	6	U23731	+	+	+	+		+	
	Tat interactive protein (60kD) (TIP60)	2	U40989	+	+	+	+		+	
30	TATA box binding protein (TBP)-associated factor, RNA polymerase II, C1, 130kD (TAF2C1) (non-exact, 55%)	1	O00268							
	TATA box binding protein (TBP)-associated factor, RNA polymerase II, F, 55kD (TAF2F)	4	X97999		+	+	+	+	+	
35	TATA box binding protein (TBP)-associated factor, RNA polymerase II, G, 32kD (TAF2G)	2	U21858		+	+	+	+	+	
	TATA box binding protein (TBP)-associated factor, RNA polymerase II, I, 28kD (TAF2I)	1	D63705	+	+	+	+		+	
40	Tax1 (human T-cell leukemia virus type I) binding protein 1 (TAX1BP1)	1	U33821		+	+	+	+	+	
	T-box 2 (TBX2) (non-exact 77%)	1	U28049				+	+	+	
	TBP-associated factor 172 (TAF-172)	1	AJ001017		+		+		+	
45	T-cell death-associated gene 8 (TDAG8)	1	U95218				+			
	T-cell leukemia/lymphoma 1A (TCL1A)	1	X82240	+						
	T-cell leukemia/lymphoma 1A (TCL1A) (low match)	1	X82240							
	T-cell receptor (delta D2-J1-region) (clone K3B)	1	M22197							

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5	threonyl-tRNA synthetase (TARS)	1	M63180		+	+	+		+	
	thrombin inhibitor	1	Z22658							
	thrombospondin 1 (THBS1)	2	X04665		+	+	+	+	+	
	thromboxane A synthase 1 (platelet, cytochrome P450, subfamily V) (TBXAZ1)	1	M80647		+		+	+	+	
10	thymidine kinase 2, mitochondrial (TK2)	2	X76104		+	+		+		
	thymidylate kinase (CDC8)	1	L16991		+	+	+		+	
	thymine-DNA glycosylase (TDG)	2	U51166	+	+	+	+		+	
	thymosin, beta 10 (TMSB10)	2	M20259	+	+	+	+	+	+	
	thymosin, beta 4, X chromosome (TMSB4X)	29	M17733		+	+	+		+	
15	thyroid autoantigen 70kD (Ku antigen) (G22P1)	7	J04811							
	thyroid hormone receptor coactivating protein (SMAP)	1	AF016270		+		+		+	
	thyroid hormone receptor interactor 7 (TRIP7)	2	L40357		+	+	+		+	
20	thyroid hormone receptor interactor 8r (TRIP8)	4	L40411		+					
	thyroid hormone receptor-associated protein, 230 kDa subunit (TRAP230)	1	D83783							
	thyroid receptor interacting protein 15 (TRIP15)	2	L40388	+	+	+	+			
	TI-227H	1	D50525							
25	TIA1 cytotoxic granule-associated RNA-binding protein (TIA1)	1	M77142		+	+	+		+	
	tissue inhibitor of metalloproteinase 1 (erythroid potentiating activity, collagenase inhibitor) (TIMP1)	1	X02598	+	+	+	+	+	+	
30	tissue inhibitor of metalloproteinase 2 (TIMP2)	1	M32304	+	+	+	+		+	high in placenta
	tissue specific transplantation antigen P35B (TSTA3)	1	U58766	+	+	+	+		+	
	titin (TTN)	1	X64697	+	+	+	+		+	high in muscle
35	TNF receptor-associated factor 2 (TRAF2)	1	U12597		+	+	+		+	
	TNF receptor-associated factor 3 (TRAF3)	1	AF110908.1		+					
	TNF receptor-associated factor 6 (TRAF6) (low match)	1	U78798							
	tol-like receptor 1 (TLR1)	1	U88540				+			
40	tol-like receptor 2 (TLR2)	1	U88878	+	+		+		+	
	tol-like receptor 4 (TLR4)	1	U88880		+				+	
	tol-like receptor 5 (TLR5)	1	AF051151		+		+			
	topoisomerase (DNA) I (TOP1)	1	J03250		+	+	+			
	topoisomerase (DNA) II beta (180kD) (TOP2B)	2	X68060	+	+	+	+		+	
45	topoisomerase (DNA) III beta (TOP3B)	3	D87012	+						
	TR3beta	1	D85245		+					
	TRAF family member-associated NF-kB activator (TANK)	3	U63830	+	+	+	+	+	+	
	TRANSALDOLASE	1	P37837							
50	transaldolase 1 (TALDO1)	4	L19437		+	+	+	+	+	

	transaldolase-related protein	1	AF010398								
5	transcobalamin II (TCII)	1	AF047576								
	transcription elongation factor B (SIII), polypeptide 1-like (TCEB1L)	2	Z47087	+	+	+	+	+	+		
	transcription elongation factor B (SIII), polypeptide 3 (110kD, elongin A) (TCEB3)	1	L47345	+	+	+	+	+	+		
10	transcription factor 12 (HTF4, helix-loop-helix transcription factors 4) (TCF12)	1	M83233	+	+	+	+	+	+		
	transcription factor 17 (TCF17)	2	D89928		+		+				
	transcription factor 4 (TCR4)	2	X52079		+	+	+		+		
15	transcription factor 6-like 1 (mitochondrial transcription factor 1-like) (TCF6L1)	2	M62810	+	+	+	+				
	transcription factor 7-like 2 (T-cell specific, HMG-box) (TCF7L2)	1	Y11306		+	+	+		+		
	transcription factor binding to IGHM enhancer 3 (TFE3)	1	X96717	+	+	+	+		+		
20	transcription factor IL-4 Stat	7	AF067575	+	+	+	+	+	+		
	transcription factor IL-4 Stat (low match)	1	U16031								
	transcription factor ISGF-3 (=M97936)	4	M97935								
25	transcription factor REST	1	A56138								
	transcription factor TFIIID	1	Z22828								
	transcriptional adaptor 2 (ADA2, yeast, homolog)-like (TADA2L)	1	AF064094								
	transcriptional intermediary factor 1 (TIF1) (non-exact 72%)	1	AF009353								
30	transducin (beta)-like 1 (TBL1)	1	Y12781	+	+	+	+		+		
	transducin-like enhancer of split 3, homolog of Drosophila E(sp1) (TLE3)	1	M99438	+	+						
	transformation/transcription domain-associated protein (TRRAP)	1	AF076974	+	+	+	+		+		
35	transformation-sensitive, similar to Saccharomyces cerevisiae STI1 (STI1L)	2	M86752		+	+	+		+		
	transforming growth factor beta-activated kinase 1 (TAK1) (non-exact 78%)	1	AB009356								
	transforming growth factor beta-stimulated protein TSC-22 (TSC22)	3	AJ222700	+	+	+	+		+		
40	transforming growth factor, beta receptor III (betaglycan, 300kD) (TGFBRI3)	1	L07594		+	+	+		+		
	transforming growth factor, beta-induced, 68kD (TGFBRI)	2	4507466	+	+	+	+	+	+		
45	TRANSFORMING GROWTH FACTOR-BETA INDUCED PROTEIN IG-H3 PRECURSOR (BETA IG-H3)	2	Q15582								
	transforming, acidic coiled-coil containing protein 1 (TACC1) (non-exact 70%)	1	AF049910								

5	transgelin 2 (TAGLN2)	14	D21261	+	+	+	+	+	+	
	transgelin 2 (TAGLN2) (non-exact)	1	D21261							
	trans-Golgi network protein (46, 48, 51kD isoforms) (TGN51)	2	AF029316		+		+			
	transient receptor potential channel 1 (TRPC1)	1	X89066		+	+	+		+	
10	transketolase (Wernicke- Korsakoff syndrome) (TKT)	7	L12711		+	+	+		+	
	translation factor sui1 homolog (GC20)	1	AF084607		+	+	+	+	+	
	translin (TSN)	3	X78627	+	+	+	+		+	
	translin-associated factor X (TSNAX)	1	X95073		+	+	+		+	
15	transmembrane glycoprotein (A33)	1	U79725							
	transmembrane protein (83kD), endoplasmic reticulum/Golgi intermediate compartment (P63)	1	X69910	+	+	+	+		+	
	transmembrane protein 1 (TMEM2)	1	AB001523		+		+		+	
20	TRANSMEMBRANE PROTEIN SEX PRECURSOR (non-exact 65%)	1	P51805							
	transmembrane trafficking protein (TMP21)	2	X97442	+	+	+	+	+	+	
	transporter 1, ABC (ATP binding cassette) (TAP1)	3	L21208	+	+	+	+		+	
25	Treacher Collins- Franceschetti syndrome 1 (TCOF1)	2	U40847	+	+	+	+		+	high in many libraries
	triophosphate isomerase 1 (TPI1)	2	X69723	+	+	+	+	+	+	
	tropomyosin	2	X04201		+	+	+		+	
	tropomyosin 4 (TPM4)	2	X05276	+	+	+	+		+	
30	TRPM-2 protein	2	M63376							
	tryptase I precursor (non- exact 64%)(=P20231)	1	A35863							
	tryptophan rich basic protein (WRB)	1	Y12478							
	tryptophanyl-tRNA synthetase (WARS)	1	X59892	+	+	+	+	+	+	
35	Ts translation elongation factor, mitochondrial (TSFM)	1	L37936	+	+		+		+	
	topoisomerase (DNA) II beta (180kD)	1	Z15115		+	+			+	
	Tu translation elongation factor, mitochondrial (TUFM)	4	L38995							
40	tuberous sclerosis 1 (TSC1)	1	AF013168		+	+	+		+	
	tuberous sclerosis 2 (TSC2)	1	X75621		+	+	+		+	
	tubulin, alpha 1 (testis specific) (TUBA1)	1	X08956		+				+	
	tubulin, alpha, ubiquitous (K-ALPHA-1)	11	K00558	+	+	+	+	+	+	high in many libraries
45	tubulin, alpha, ubiquitous (K-ALPHA-1) (low match)	1	K00558							
	tubulin-specific chaperone c (TBCC)	1	U61234		+	+	+		+	
	tumor necrosis factor (ligand) superfamily, member 10 (TNFSF10)	7	U37518		+	+	+		+	

5	tumor necrosis factor (ligand) superfamily, member 13 (TNFSF13)	1	AF046888	+	+	+	+	+	+	
	tumor necrosis factor (ligand) superfamily, member 14 (TNFSF14)	1	AF036581							
	tumor necrosis factor (ligand) superfamily, member 8 (TNFSF8)	1	D38122	+						Found only in library 386: T-cell lymphoma
10	tumor necrosis factor (ligand) superfamily, member 8 (TNFSF8)	1	L09753	B only						
	tumor necrosis factor alpha-inducible cellular protein containing leucine zipper domains (FIP2)	1	AF061034		+	+	+	+	+	
15	tumor necrosis factor receptor superfamily member 7 (TNFRSF7)	2	M63928		+				+	
	tumor necrosis factor receptor superfamily, member 10b (TNFRSF10B)	1	AF016266		+	+	+	+	+	
	tumor necrosis factor receptor superfamily, member 10c, decoy without an intracellular domain (TNFRSF10C)	3	AF012629						+	
20	tumor necrosis factor receptor superfamily, member 10d, decoy with truncated death domain (TNFRSF10D) (non-exact 84%)	1	AF023849							found only in prostate
25	tumor necrosis factor receptor superfamily, member 12 (translocating chain-association membrane protein) (TNFRSF12)	1	U84508	+	+	+	+	+	+	
	tumor necrosis factor receptor superfamily, member 14 (herpesvirus entry mediator) (TNFRSF14)	1	U70321	+	+	+	+	+	+	
30	tumor necrosis factor receptor superfamily, member 1B (TNFRSF1B)	5	U52165	+	+	+	+	+	+	
	tumor necrosis factor receptor superfamily, member 6 (TNFRSF6)	1	X63717	B, W						+
35	tumor necrosis factor receptor superfamily, member 7 (TNFRSF7)	1	M63928	+	+					
	tumor necrosis factor, alpha-induced protein 2 (TNFAIP2)	8	M82357		+	+		+		
	tumor necrosis factor, alpha-induced protein 3 (TNFAIP3)	2	M59465							
40	tumor protein 53-binding protein, 1 (TP53BP1)	1	AF078776		+	+	+		+	
	tumor protein p53 (Li-Fraumeni syndrome) (TP53)	1	M14695	+	+				+	
	tumor protein p53-binding protein (TP53BP1)	1	U82939	+			+		+	
45	tumor protein, translationally-controlled 1 (TPT1)	35	X16064							
	tumor protein, translationally-controlled 1 (TPT1) (low score)	1	X16064							
50	tumor rejection antigen (gp96) 1 (TRA1)	9	X15187	+	+	+	+	+	+	

[illegible]

5	ubiquitin carboxyl-terminal esterase L3 (ubiquitin thioesterase) (UCHL3)	1	M30496	+	+	+	+	+	+	+
	ubiquitin fusion degradation 1-like (UFD1L)	1	U64444	+	+	+	+	+	+	+
	ubiquitin protein ligase E3A (human papilloma virus E6-associated protein, Angelman syndrome) (UBE3A)	1	U84404	B	+	+	+	+	+	+
10	ubiquitin specific protease 10 (USP10)	4	U80012	+	+	+	+	+	+	+
	ubiquitin specific protease 11 (USP11)	1	U44839	+	+	+	+	+	+	+
	ubiquitin specific protease 15 (USP15)	3	AB011101	+	+	+	+	+	+	+
	ubiquitin specific protease 19 (USP19)	1	AB020698	+	+	+	+	+	+	+
15	ubiquitin specific protease 4 (proto-oncogene) (USP4)	1	AF017305	B	+	+	+	+	+	+
	ubiquitin specific protease 4 (proto-oncogene) (USP4) (non-exact, 66%)	1	AF017306							
	ubiquitin specific protease 7 (herpes virus-associated) (USP7)	1	Z72499		+	+	+	+	+	+
20	ubiquitin specific protease 8 (USP8)	5	D29958		+	+	+	+	+	+
	UBIQUITIN-ACTIVATING ENZYME E1 (A1S9 PROTEIN) (56%)	1	P22314							
25	ubiquitin-activating enzyme E1 (A1S9T and BN75 temperature sensitivity complementing) (UBE1)	1	M58028	+	+	+	+	+	+	+
	ubiquitin-activating enzyme E1, like (UBE1L)	1	L34170	+	+	+	+	+	+	+
	UBIQUITIN-BINDING PROTEIN P62; phosphotyrosine independent ligand for the Lck SH2 domain p62 (P62)	1	U41808			+		+		
30	ubiquitin-conjugating enzyme E2 variant 1 (UBE2V1)	2	U49278	+	+	+	+	+	+	+
	ubiquitin-conjugating enzyme E2 variant 2 (UBE2V2)	1	X98091							
35	UBIQUITIN-CONJUGATING ENZYME E2-17 KD (UBIQUITIN-PROTEIN LIGASE)	1	Q16781							
	ubiquitin-conjugating enzyme E2B (RAD6 homolog) (UBE2B)	1	M74525	+	+	+	+	+	+	+
40	ubiquitin-conjugating enzyme E2G 2 (homologous to yeast UBC7) (UBE2G2)	1	AF032456	+	+	+	+	+	+	+
	ubiquitin-conjugating enzyme E2H (homologous to yeast UBC8) (UBE2H)	1	Z29328	+	+	+	+	+	+	+
	ubiquitin-conjugating enzyme E2L 1 (UBE2L1)	1	X92962		+	+				+
45	ubiquitin-conjugating enzyme E2L 3 (UBE2L3)	3	AJ000519		+	+	+	+	+	+
	ubiquitin-conjugating enzyme E2L 6 (UBE2L6)	4	AF031141		+	+	+	+	+	+
	ubiquitin-like 1 (sentrin) (UBL1)	2	U61397	+	+	+	+	+	+	+

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5	X-ray repair complementing defective repair in Chinese hamster cells 5 (double-strand-break rejoining: Ku autoantigen, 80kD) (XRCC5)	1	M30938	+	+	+	+	+	+	high in spleen
	XRP2 protein	1	AJ007590							
10	yellow differentiation primary response gene (88) (MYD88)	1	U84408		+	+	+	+	+	
	zeta-chain (TCR) associated protein kinase (70kD) (ZAP70)	1	L05148	+				+		
	zeta-chain (TCR) associated protein kinase (70kD) (ZAP70) (low match)	1	L05148							
15	zinc finger protein (Hs.47371)	2	U69274	+	+	+	+	+	+	
	zinc finger protein (Hs.78765)	1	U69645	+	+	+	+	+	+	
	zinc finger protein 10 (KRX1) (ZNF10)	1	X78933							+ only
20	ZINC FINGER PROTEIN 124 (HZF-18) (non-exact 51%)	1	Q15973							
	zinc finger protein 124 (HZF-18) (ZNF124) (non-exact, 78%)	1	S54841							
	ZINC FINGER PROTEIN 133	1	P52736							
25	zinc finger protein 136 (clone pHZ-20) (ZNF136)	1	U09367			+	+			
	zinc finger protein 140 (clone pHZ-39) (ZNF140)	1	U09368		+		+		+	
	zinc finger protein 140 (clone pHZ-39) (ZNF140) (non-exact 59%)	1	AF060865							
30	zinc finger protein 140 (clone pHZ-39) (ZNF140) (non-exact 73%)	1	U09368							
	zinc finger protein 140 (clone pHZ-39) (ZNF140) (non-exact 73%aa)	1	S66508							
	zinc finger protein 140 (clone pHZ-39) (ZNF140) (non-exact, 80%)	1	U09368							
35	zinc finger protein 143 (clone pHZ-1) (ZNF143)	2	U09850	+	+	+	+	+	+	
	zinc finger protein 143 (clone pHZ-1) (ZNF143) (low match)	1	U09850							
	zinc finger protein 148 (pHZ-52) (ZNF148)	1	AF039019	+						
40	ZINC FINGER PROTEIN 151 (MIZ-1 PROTEIN) (low match)	1	Q13105							
	zinc finger protein 173 (ZNF173)	1	U09825	B, I	+	+		+		
	zinc finger protein 192 (ZNF192) (non-exact, 66%)	1	U57798							
	zinc finger protein 198 (ZNF198)	1	AJ224901		+	+	+			
45	zinc finger protein 2 (ZNF2) (low match)	1	X60152							
	zinc finger protein 200 (ZNF200)	1	AF080868		+		+			
	zinc finger protein 207 (ZNF207)	6	AF046001	+	+	+	+	+	+	high in prostate
	zinc finger protein 216 (ZNF216)	2	AF062072	+	+	+	+		+	

5	zinc finger protein 217 (ZNF217)	1	AF041259	1 activated						+	
	ZINC FINGER PROTEIN 22 (ZINC FINGER PROTEIN KOX15) (non-exact 58%)	1	P17026								
	zinc finger protein 230 (ZNF230)	1	U95044		+						
10	zinc finger protein 239 (ANF239)	1	L25914		+		+				
	zinc finger protein 261 (ZNF261)	1	AB002383		+	+	+			+	
	zinc finger protein 262 (ANF262)	1	AB007885		+	+	+			+	
	zinc finger protein 263 (ZNF263)	1	D88827								
15	zinc finger protein 264 (ZNF264)	1	AB007872		+	+	+				
	ZINC FINGER PROTEIN 33A (ZINC FINGER PROTEIN KOX31) (KIAA0065) (HA0946)	1	Q06730								
20	zinc finger protein 42 (myeloid-specific retinoic acid-responsive) (ZNF42)	1	M58297		+	+	+	+		+	
	zinc finger protein 43 (HTF6) (ZNF43) (low match)	1	X59244								
	zinc finger protein 43 (HTF6) (ZNF43) (non-exact, 54%)	1	X59244								
25	zinc finger protein 43 (HTF6) (ZNF43) (non-exact, 71%)	1	X59244								
	ZINC FINGER PROTEIN 43 (ZINC PROTEIN HTF6) (non-exact 67%)	1	P28160								
	zinc finger protein 45 (a Kruppel-associated box (KRAB) domain polypeptide) (ZNF45)	1	L75847								only found in testis
30	ZINC FINGER PROTEIN 46 (ZINC FINGER PROTEIN KUP) (non-exact 62%)	1	P24278								
	zinc finger protein 6 (CMPX1) (ZNF6)	1	X56465		+	+	+			+	
35	zinc finger protein 74 (Cos52) (ZNF74) (non-exact, 67%)	1	X71623								
	zinc finger protein 76 (expressed in testis) (ZNF76)	1	M91592		+	+	+			+	
	ZINC FINGER PROTEIN 83 (ZINC FINGER PROTEIN HPF1) (non-exact 65%)	1	P51522								
40	zinc finger protein 84 (HPF2) (ZNF84)	1	M27878	1 activated	+	+				+	
	zinc finger protein 85 (ZNF85)	2	U35376		+	+	+				
	zinc finger protein 9 (ZNF9)	5	M28372		+	+	+	+	+	+	
	ZINC FINGER PROTEIN 93 (=ZINC FINGER PROTEIN HTF34) (non-exact 70%)	1	P35789								
45	zinc finger protein C2H2-25 (ZNF25)	3	U38904		+	+	+				
	zinc finger protein clone L3-4	1	AF024708								
50	zinc finger protein homologous to Zfp-38 in mouse (ZFP36)	4	M92843	+							blood only

5	ZINC FINGER PROTEIN HRX (ALL-1) (71%a.a.)	1	Q03164								
	zinc finger protein HZF4	1	X78927								
	zinc finger protein RIZ	1	D45132	+	+	+	+				
	zinc finger protein, subfamily 1A, 1 (Ikaros) (LYF1)	1	U40462	+							
10	zinc finger protein, subfamily 1A, 1 (Ikaros) (LYF1) (low match)	1	U40462								
	zinc finger transcriptional regulator (GOS24)	1	M82844								
	zinc-finger helicase (hZFH)	2	U91543	+	+	+	+			+	
	Zn-15 related zinc finger protein (rf)	1	U22377		+	+	+				
15	Zn-15 related zinc finger protein (rf) (non-exact 56%)	1	U22377								
	ZNF80-linked ERV9 long terminal repeat	1	X83497								
	ZW10 (Drosophila) homolog, centromere/kinetochore protein (ZW10)	2	U54996		+						
20	zyxin (ZYX)	4	X85735								

Column 1: List of unique genes derived from 6,283 known ESTs from blood cells.

Column 2: Number of genes found in randomly sequenced ESTs from blood cells.

5 Column 3: Accession number. Column 4: "+" indicates the presence of the unique gene in publicly available cDNA libraries of blood (Bl), brain (Br), heart (H), kidney (K), liver (Li) and lung (Lu). **Comparison to previously identified tissue-specific genes was determined using the GenBank of the National Centre of Biotechnology Information (NCBI) Database.

Discussion

Every cell and tissue comprising the human body share the necessary genetic information required to maintain cellular homeostasis. These "housekeeping" genes function in basic cellular maintenance, including energy metabolism and cellular structure in all cell types. However, in certain situations, even the housekeeping genes show altered expression. Thus, it is necessary to define the use of these genes as internal controls from one investigation to another. Current results from the human blood cell EST database indicate that over 50% of the transcripts are

5 widely expressed throughout the human body. Most of the cell or tissue specific
genes are also detectable in blood cells by RT-PCR analysis.

10 For example, isoformic myosin heavy chain genes are known to be
generally expressed in cardiac muscle tissue. In the rodent, the β MyHC gene is only
5 highly expressed in the fetus and in diseased states such as overt cardiac hypertrophy,
heart failure and diabetes; the α MyHC gene is highly expressed shortly after birth and
continues to be expressed in the adult heart. In the human, however, β MyHC is
15 highly expressed in the ventricles from the fetal stage through adulthood. This highly
expressed β MyHC, which harbours several mutations, has been demonstrated to be
10 involved in familial hypertrophic cardiomyopathy (Geisterfer-Lowrance *et al.* 1990).
It was reported that mutations of β MyHC can be detected by PCR using blood
lymphocyte DNA (Ferric *et al.*, 1992). Most recently, it was also demonstrated that
25 mutations of the myosin-binding protein C in familial hypertrophic cardiomyopathy
can be detected in the DNA extracted from lymphocytes (Niimura *et al.*, 1998).

15 Similarly, APP and APC, which are known to be tissue specific and
predominantly expressed in the brain and intestinal tract, are also detectable in the
30 transcripts of blood. These cell- or tissue-specific transcripts are not detectable by
Northern blot analysis. However, the low number of transcript copies can be detected
by RT-PCR analysis. These findings strongly demonstrate that genes preferentially
35 20 expressed in specific tissues can be detected by a highly sensitive RT-PCR assay. In
recent years, evidence has been obtained to indicate that expression of cell or tissue-
restricted genes can be detected in the peripheral blood of patients with metastatic
40 transitional cell carcinoma (Yuasa *et al.* 1998) and patients with prostate cancer (Gala
et al. 1998).

25 Atrial natriuretic factor (ANF) and zinc finger protein (ZFP), which are
45 known to be highly expressed in heart tissue biopsies and in the plasma of heart
failure patients, are also detectable in the transcripts of blood. Differential expression
of zinc finger protein among the normal, diabetic and asymptomatic preclinical
50

5 subjects may have additional value as a prophylactic "early warning system". On a
related note, there is now more attention/discussion in the cardiovascular disease field
being focused on Syndrome X, loosely defined as a continuum of hypertension,
10 increasing sugar levels, diabetes, kidney failure, culminating in heart failure, with the
possibility of stroke and heart attack at any time in the continuum. The early
5 identification of patients at risk of organ failure has been a challenge to the medical
community for some time and the present method has the potential of resolving or, at
least, ameliorating this challenge.

The present invention demonstrates that a simple drop of blood may be
10 used to determine the quantitative expression of various mRNAs that reflect the
health/disease state of the subject through the use of RT-PCR analysis. This entire
20 process takes about three hours or less. The single drop of blood may also be used for
multiple RT-PCR analyses. There is no need for large samples and/or costly and
time-consuming separation of cell types within the blood for this method as compared
25 to the methods described by Kimoto (1998) and Chelly et al. (1989; 1988). It is
believed that the present finding can potentially revolutionize the way that diseases
30 are detected, diagnosed and monitored because it provides a non-invasive, simple,
highly sensitive and quick screening for tissue-specific transcripts. The transcripts
detected in whole blood have potential as prognostic or diagnostic markers of disease,
35 as they reflect disturbances in homeostasis in the human body. Delineation of the
sequences and/or quantitation of the expression levels of these marker genes by RT-
PCR will allow for an immediate and accurate diagnostic/prognostic test for disease or
40 to assess the efficacy and monitor a particular therapeutic.

In addition to RT-PCR, other methods of amplifying may also be used
25 for the purpose of measuring/quantitating tissue-specific transcripts in human blood.
For example, mass spectrometry may be used to quantify the transcripts (Koster et al.,
45 1996; Fu et al., 1998). The application of presently disclosed method for detecting
tissue-specific transcripts in blood does not restrict to subjects undergoing course of

5 therapy or treatment, it may also be used for monitoring a patient for the onset of
overt symptoms of a disease. Furthermore, the present method may be used for
detecting any gene transcripts in blood. A kit for diagnosing, prognosing or even
10 predicting a disease may be designed using gene-specific primers or probes derived
5 from a whole blood sample for a specific disease and applied directly to a drop of
blood. A cDNA library specific for a disease may be generated from whole blood
samples and used for diagnosis, prognosis or even predicting a disease.

15 The following references were cited herein:

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- 10 Chelly J *et al.* (1989). *Proc. Nat. Acad. Sci. USA*. 86:2617-2621.
- 20 Chelly J *et al.* (1988). *Nature* 333:858-860.
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10 Any patents or publications mentioned in this specification are
5 indicative of the levels of those skilled in the art to which the invention pertains.
Further, these patents and publications are incorporated by reference herein in their
entirety to the same extent as if each individual publication was specifically and
15 individually indicated to be incorporated by reference.

One skilled in the art will appreciate readily that the present invention
10 is well adapted to carry out the objects and obtain the ends and advantages mentioned,
20 as well as those objects, ends and advantages inherent herein. The present examples,
along with the methods, procedures, treatments, molecules, and specific compounds
described herein are presently representative of preferred embodiments, are
25 exemplary, and are not intended as limitations on the scope of the invention. Changes
15 therein and other uses will occur to those skilled in the art which are encompassed
within the spirit of the invention as defined by the scope of the claims.

Claims

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WHAT IS CLAIMED IS:

1. A method for detecting expression of a gene in blood from a subject, comprising the steps of:

- a) quantifying RNA from a subject blood sample; and
- b) detecting expression of said gene in the quantified RNA, wherein the expression of said gene in said quantified RNA indicates expression of said gene in the subject blood.

2. The method of claim 1, wherein the quantification is performed by mass spectrometry.

3. A method for detecting expression of one or more genes in blood from a subject, comprising the steps of:

- a) obtaining a subject blood sample;
- b) extracting RNA from said blood sample;
- c) amplifying said RNA;
- d) generating expressed sequence tags from the amplified RNA product; and
- e) detecting expression of said genes in the expressed sequence tags, wherein the expression of said genes in said expressed sequence tags indicates expression of said genes in the subject blood.

4. The method of claim 3, wherein said genes are non-cancer-associated genes.

5. The method of claim 3, wherein said genes are tissue-specific genes.

5

6. The method of claim 3, wherein said subject is a fetus, an embryo, a child, an adult or a non-human animal.

10

5 7. The method of claim 3, wherein the amplification is performed by RT-PCR.

15

8. The method of claim 7, wherein said RT-PCR utilizes primers selected from the group consisting of random sequence primers and gene-specific primers.

20

9. A method for detecting expression of one or more genes in blood from a subject, comprising the steps of:

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a) obtaining a subject blood sample;

15

b) extracting DNA fragment(s) from said blood sample;

c) amplifying said DNA fragment(s); and

30

d) detecting expression of said genes in the amplified DNA product, wherein the expression of said genes in said amplified DNA product indicates expression of said genes in the subject blood.

35

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10. A method for monitoring a course of therapeutic treatment in an individual, comprising the steps of:

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a) obtaining a blood sample from said individual;

b) extracting RNA from said blood sample;

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c) amplifying said RNA;

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d) generating expressed sequence tags from the amplified RNA product; and

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5 e) detecting expression of genes in said expressed sequence tags,
wherein the expression of said genes is associated with the effect of said therapeutic
treatment; and

10 f) repeating steps a)-e), wherein the course of said therapeutic
5 treatment is monitored by detecting the change of expression of said genes in the
expressed sequence tags.

15 11. The method of claim 10, wherein the amplification is
performed by RT-PCR.

20 12. The method of claim 11, wherein the change of expression of
said genes in the expressed sequence tags is monitored by sequencing the expressed
sequence tags and comparing the resulting sequences at various time points.

25 13. The method of claim 11, wherein the change of expression of
15 said genes in the expressed sequence tags is monitored by performing single
nucleotide polymorphism analysis and detecting the variation of a single nucleotide in
30 the expressed sequence tags at various time points.

35 20 14. The method of claim 10, wherein said individual is monitored
for the onset of overt symptoms of a disease, and wherein the expression of said genes
is associated with the onset of said symptoms.

40 15. A method for diagnosing a disease in a test subject, comprising
25 the steps of:

45 a) generating a cDNA library for said disease from a whole blood
sample from a normal subject;

5 b) generating expressed sequence tag (EST) profile from the
normal subject cDNA library;

10 c) generating a cDNA library for said disease from a whole blood
sample from a test subject;

15 d) generating EST profile from the test subject cDNA library; and

 e) comparing the test subject EST profile to the normal subject
EST profile, wherein if said test subject EST profile differs from said normal subject
EST profile, said test subject might be diagnosed with said disease.

20 16. A kit for diagnosing, prognosing or predicting a disease,
comprising:

25 a) gene-specific primers; wherein said primers are designed in
such a way that the sequences of said primers contain the opposing ends of two
adjacent exons for the specific gene with the intron sequence excluded; and

30 b) a carrier, wherein said carrier immobilizes said primer(s).

35 17. The kit of claim 16, wherein said gene-specific primer(s) are
selected from the group consisting of insulin-specific primers, atrial natriuretic factor-
specific primers, zinc finger protein gene-specific primers, beta-myosin heavy chain
20 gene-specific primers, amyloid precursor protein gene-specific primers, and
adenomatous polyposis-coli protein gene-specific primers.

40 18. The kit of claim 17, wherein the sequences of said gene-
specific primers are selected from the group consisting of SEQ ID Nos. 1 and 2, and
25 SEQ ID Nos. 5 and 6.

45 19. A method for diagnosing, prognosing or predicting a disease in
a test subject, comprising the step of:

5 applying the kit of claim 16 to a test subject whole blood sample,
wherein quantitative expression levels of specific genes associated with said disease
are detected and compared to the levels of said specific genes expressed in a normal
10 subject, therefore, said disease may be diagnosed, prognosed or predicted.

5 20. The method of claim 19, wherein said method is used for
monitoring a course of therapeutic treatment or monitoring the onset of overt
15 symptoms of said disease.

10 21. A kit for diagnosing, prognosing or predicting a disease,
20 comprising:

- a) probes derived from a whole blood sample for a specific
 disease; and
25 b) a carrier, wherein said carrier immobilizes said probes.

15 22. A method for diagnosing, prognosing or predicting a disease in
30 a test subject, comprising the step of:

 applying the kit of claim 21 to a test subject whole blood sample,
 wherein quantitative expression levels of specific genes associated with said disease
35 20 are detected and compared to the levels of said specific genes expressed in a normal
subject, therefore, said disease may be diagnosed, prognosed or predicted.

40 23. The method of claim 22, wherein said method is used for
monitoring a course of therapeutic treatment or monitoring the onset of overt
25 symptoms of said disease.

45 24. A cDNA library specific for a disease, wherein said cDNA
library is generated from whole blood samples.

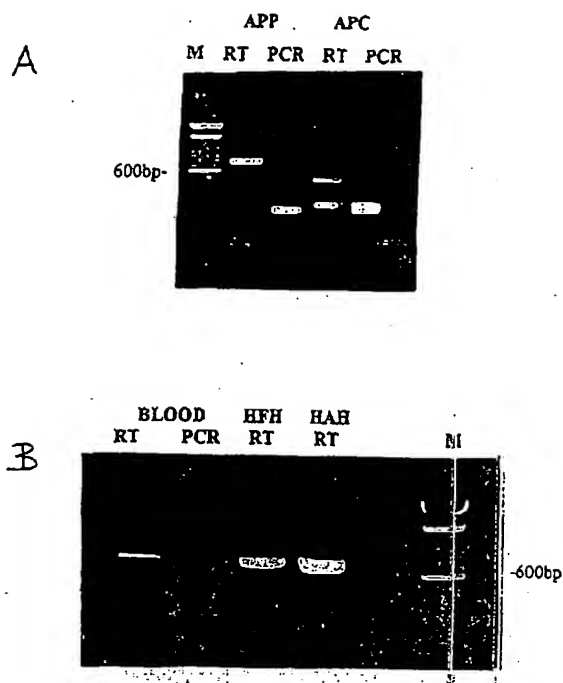


FIGURE 1

1 2 3 4 5 6 7 8



FIGURE 2

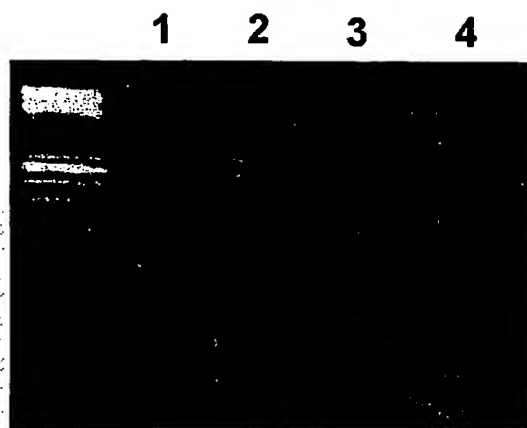


FIGURE 3

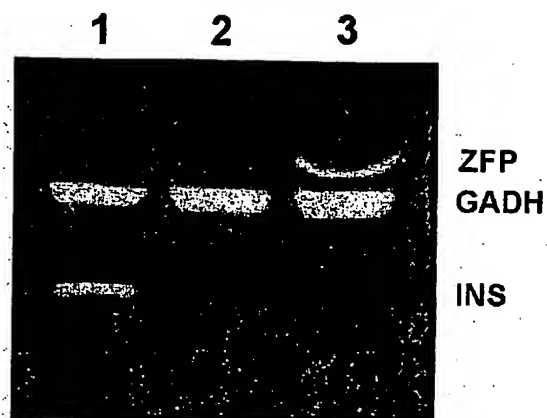
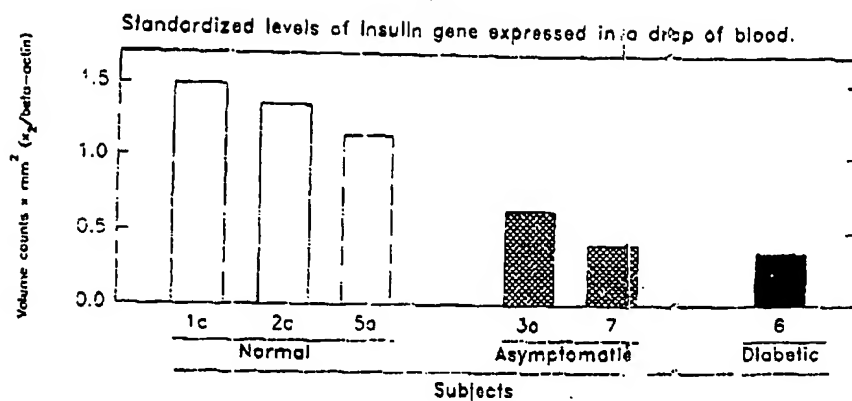


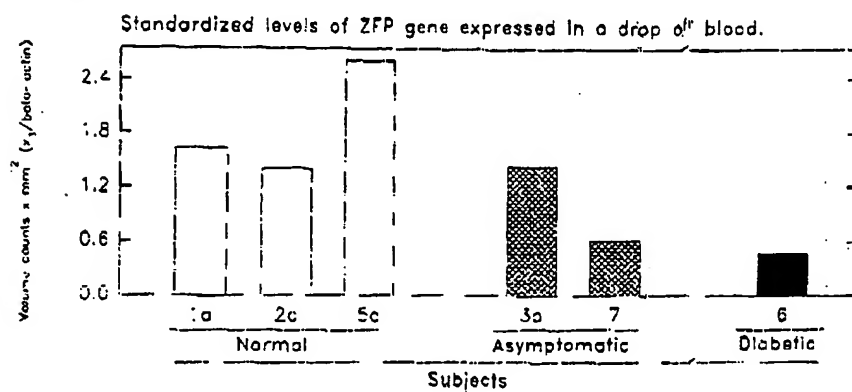
FIGURE 4

A.

5/7



B.



C.

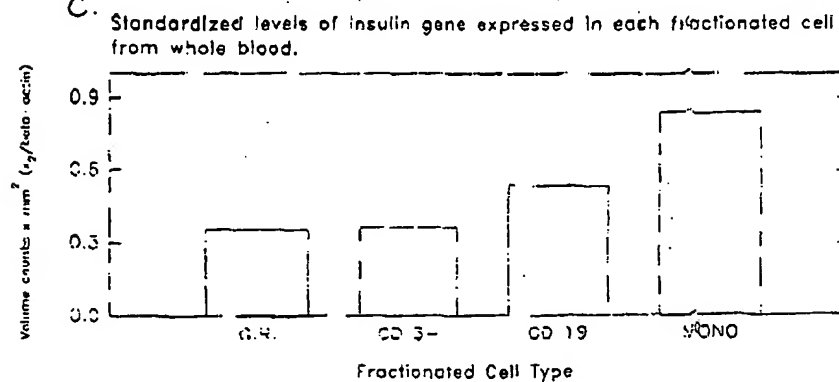
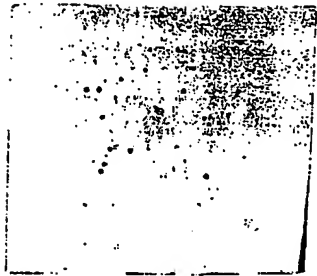


FIGURE 5

CC view Sept 1999

A



B

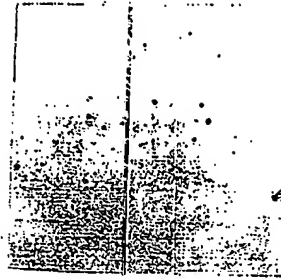
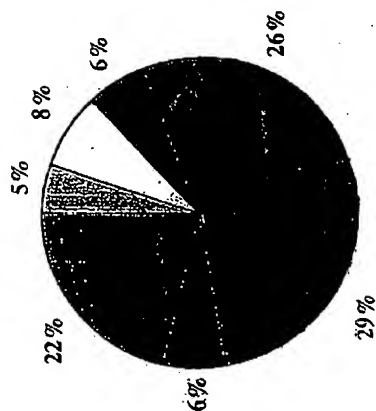


FIGURE 6

Total :13, 283 ESTs
 Known: 6,283
 Mitochondrial: 405
 Ribosome: 498
 Repeat: 868
 Mis. : 156
 Novel: 2,718

- Cell Division
- Cell Signalling/Communication
- Cell structure/Motility
- Cell/organism defense
- Gene/Protein expression
- Metabolism
- Unclassified

Human Blood



Human Fetal Heart

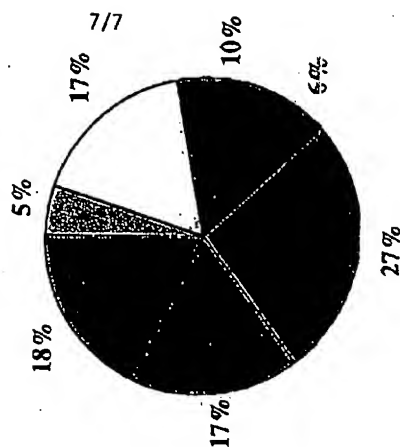


FIGURE 7

SEQUENCE LISTING

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WO 00/40749

PCT/CA00/00005

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